

Padma Sri Dr Y. Nayudamma (1922-1985), born in a remote village near Tenali, began his career as a demonstrator on monthly salary of Rs.17. A legend in his life time, he put Indian leather on the world map. A visionary far ahead of his time, his sage counsel was sought by every developing country and many UN bodies. This book captures the life and times of Y. Nayudamma - his humble beginnings, spectacular achievements as scientist-bureaucrat, the vicissitudes of his personal life and his tragic death.

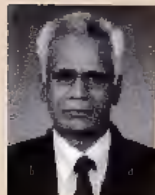


Dr Nayudamma was among the first to urge scientists to step in and help in integrated rural development.

- Dr Manmohan Singh
Former Prime Minister of India

Nayudamma was a true karmayogi in the ancient Indian tradition and found personal joy and a spiritual fulfillment in a job well done.

- Dr M. S. Swaminathan
Father of the Green Revolution in India



K. Chandrabhas belonging to Rajampelly village in Anaparthi District joined the IRS in 1976 and retired as Chief Commissioner of Income-tax. He and K. K. Mohapatra have translated from Telugu into English a collection of short stories of Srirama titled 'Michunam and Other Stories' (2011) and selected short stories of Chaso published by the Sahitya Akademi (2014). This biography translated by the author into Telugu. The author can be contacted on e-mail: kchandrabhas@yahoo.com and on phone no. 8008449678.



BIOGRAPHY



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THE PEOPLE'S SCIENTIST

A BIOGRAPHY OF DR Y. NAYUDAMMA

STUDENT EDITION



PRISM

THE PEOPLE'S SCIENTIST
A Biography of Dr Y. Nayudamma

K. CHANDRAHAS

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NARA CHANDRABABU NAIDU



CHIEF MINISTER

HYDERABAD

With new awakening, India is gearing up to make rapid strides in achieving social and economic progress. Curiously, the newly shaped state of Andhra Pradesh is aspiring and planning to lead this journey to progress by regrouping its resources and experiences. The role of inspired and creative youth is crucial in this uphill endeavour. We need to motivate our youth through various means. Biographies of great people, especially of illustrious leaders and eminent scientists, influence the shaping of young minds and elevate their ideals and aspirations. Dr Y Nayudamma was a reputed scientist and leader as well. I still reminisce my brief acquaintance with him in the early eighties. Sri K Chandrahas, former Chief Commissioner of Income Tax, did a commendable job in writing the biography of Dr Nayudamma. I am happy to learn that student version of the book is being brought now at the instance of Sri Praksh Vidya Niketan, Visakhapatnam, a group which is providing quality and value based education. I am sure the book will inspire the young minds and steer them towards achieving things of social value and generate scientific temper. I wish that Sri Chandrahas will bring many more such lofty creative works for the benefit of the society. I wish him all success in his present and future accomplishments.


NARA CHANDRABABU NAIDU
CHIEF MINISTER

Dedicated to my father-in-law
Dr D.L. Narayana
Professor of Economics
Sri Venkateswara University, Tirupati



(1925-2010)

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I did not know Nayudamma personally and yet I ventured to write this biography because of persistence and support of K. Seshagiri Rao and Subbarama Naidu, who had worked under Nayudamma. Ratheish, Nayudamma's son, who passed away last month, shared information about Nayudamma. Anjana Nani, Ratheish's daughter, helped me with a few rare photographs of Nayudamma. Dr Somaraju Suseela shared her perspective on Nayudamma with me. She also has permitted me to use her story in the book. Yadlapati Venkata Rao spared his time and recounted his childhood days with Nayudamma. Vishnumurthy of Nayudamma Memorial Trust, Tenali gave me a few articles on Nayudamma. Yelavarthy Subbarao, a close relative of Nayudamma, shared his thoughts on the life and times of Nayudamma besides giving me a couple of photographs. I thank them all for their time and help.

I also thank Dr J. L. Reddy, K. K. Mohapatra, Kata Ramanjaneyulu, Ravindranath of Prism Books, Ch.Vasu Prakash of Sri Prakash Vidya Niketan and Dr K. Lakshminarayana, my wife, Amarasree, for their encouragement. I owe a deep debt of gratitude to Prof. C. Subbarao for his help and for writing the Foreword.

November 2014

K. Chandrabas



A TRIBUTE

With a noble vision to 'Nurture Joyful Learning with Holistic Growth', Sri Prakash Vidya Niketan has been providing quality education with values for more than three and half decades in the districts of Visakhapatnam and East Godavari of Andhra Pradesh.

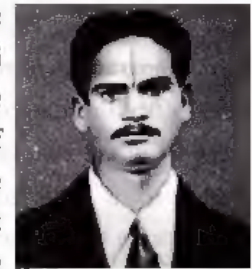
What began as a humble odyssey on August 19th, 1977, the seeds of which were laid at Tuni, with 112 students initially, by the Founder and Visionary Sri Ch. V. K. Narasimha Rao, Sri Prakash Vidya Niketan, has since blossomed into a titan among education providers with many centres of learning. His strong belief in the thought 'Promotion of rural education leads to prosperity of the nation' propelled Sri Narasimha Rao towards the mission of augmenting academic skills with excellence on the physical, social and emotional fronts, based on sound ethics and values. He is ably assisted in carrying forward the torch that brings scholastic light into many lives by his sons, Ch.Vasu Prakash, Ch.Ajay Prakash and Ch. Vijay Prakash.



Sri Prakash Vidya Niketan, which started functioning in Visakhapatnam with 220 students, today provides education to more than 4000 students in four branches across the city. The schools are driven by the dictum 'Great men were children one day, and children can be great men some day'.

In Sri Prakash Vidya Niketan, competence follows character, and the teachers work together in harmony to provide the students an environment congenial for study blended with activities that infuse traditional values and ethics. Workshops and orientation programs are organized frequently to enable the teachers reinvent themselves. The teaching program provides ample scope for imbibing in students a well-balanced and all-round personality through interactions with eminent intellectuals in education, and inspiring luminaries in sports and games, arts, culture and science and technology.

In memory of my grandfather, Late Chitturi Venkata Durga Prakashrao, Sri Prakash Vidya Niketan deems it a privilege to present to its students the biography of Dr. Yelavarthi Nayudanamma, detailing the life and achievements of the eminent scientist. His works are bound to stimulate the spirit of enquiry and the thirst for learning as the younger generation on the planet marches ahead to overcome challenges and scale greater heights.



November 7, 2014

Ch.Vasu Prakash

Director, Sri Prakash Vidya Niketan, Visakhapatnam

FOREWORD

*Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time.*

- H. W. Longfellow

Lives of great men provide a learning opportunity for young readers to aim high and dream big. In the formative period of one's life, students tend to look for role models to emulate and follow. Biographies of eminent people offer examples of challenges met, difficulties overcome and promises kept. We have classic accounts of the lives of Gandhi and Nehru. The triumph of the human spirit embodied in such narratives exerts a profound influence on impressionable minds.

This is the biography of a scientist nearer home whose life and professional career reflect a deep commitment to enduring values of honesty and integrity, discipline and dedication to the cause of science and technology.

You could see in Dr Nayudamma's career a sustained and serious intention to find practical and low cost solutions to people's problems. He was not an ivory tower scientist content to pursue

his line of work for its own sake. He was completely at home in the village or the city always searching for effective alternatives for development. He was the kind who could never lose sight of his obligations to the soil of his birth.

It was Dr Ambedkar who said that the besetting sin of the country is to seek to idealise the actual rather than to actualise the ideal. When we look at the life and work of Dr Nayudamma, we are left with an overwhelming feeling that here was a scientist who always sought the value of actualising the ideal.

K. Chandrabhas has successfully captured the spirit of a conscientious scientist who became a legend in his own life time as 'people's scientist' leaving his footprints wherever he went.

November 2014

Prof. C. Subbarao

Former Chairman, A. P. State Council of Higher Education

JOURNEY TO THE BELOVED VILLAGE

'Farmer by birth, untouchable by profession' is the enigmatic self-introduction which Dr Nayudamma used quite often at the height of his career as the Director of the Central Leather Research Institute and later as the Director General of the Council of Scientific and Industrial Research. And, yet few would fail to notice the blend of irony and fact in this self-description which is at once a subtle reminder of his humble origins and a subtler comment on the scientific ethos of post-Independent India.

Inspired by Nehru's 'Tryst with Destiny' call and the vision of 'Temples of Modern India', many scientists wanted to actively participate in nation building and development. Like so many post-Independence youth, Nayudamma believed that a technology appropriate and cost-effective to the local needs would enable the country to be self-reliant and bring about development to the most needy in the country. In short, what the country sought, according to Nayudamma and his ilk, was not so much what scientists 'can do' but an awareness of what scientists 'ought to do'. In other words, not highbrow science but lowbrow technology. It is in this background that 'untouchable by profession' acquires not just politically correct overtones but very factual attitudes of high ranking scientists of the era.

On 5 March 1980, Nagaram's Sri Velgapudi Ramakrishna Memorial College felicitated Nayudamma along with Dr Sanjivdev, a renowned painter and philosopher. After the programme, they both sat under the shade of a tree of the college compound and held a long and interesting discussion on science and art, beginning with Sanjivdev's comment: 'Of late, Nayudamma, you don't seem to stay in the country for long.' His commitment to the world of science and technology had by then taken him to more than 54 countries, often to the same cities of the world repeatedly, advising international bodies and governments on science and technology. So extensive and frequent had been his travels that he broke into a smile and said, 'Not just this country. I'm not spending much time in any country.'

Of all his journeys, within and outside the country, the one that Dr Nayudamma loved most was to Yelavarru, his native village. He often said, 'You can take a person out of the village but you can't take the village out of the person.' This was actually a statement about himself and so what he said carried much conviction. He remained a villager at heart regardless of the high positions he held, and his love for Yelavarru remained undiminished until his last breath. He never missed an opportunity to visit Yelavarru. He wished to spend time in the village, with his parents as also the simple villagers of all castes, whom he loved so dearly and who warmed up to him in equal measure.

In the early 1960s, Howrah Mail from Madras to Calcutta passed through Nidubrolu station of Guntur district. The train had no scheduled halt at Nidubrolu. But if a first class ticket had been bought for travel to Nidubrolu, the train would halt for just

five minutes. This was done as a concession to N. G. Ranga, the veteran leader, who was from Nidubrolu. Since the facility could not have been extended exclusively to a person, however eminent he might be, the rule allowed a halt at Nidubrolu for Howrah Mail only if a first class ticket to Nidubrolu had been bought by at least one passenger.

Whenever Nayudamma wished to visit Yelavarru, he would board Howrah Mail at Madras in the night, get off the train early next morning at Nidubrolu station and hire a horse-drawn tonga to take him to Inturu. Until the early 1970s, tongas plied between Nidubrolu station and Inturu, five miles off. He would stay overnight at his sister's house at Inturu and walk next day to Yelavarru, all of two miles across the fields, chatting with villagers who joined him along. He would not inform anyone about his visit. Nor did he like anyone come to the station to receive him.

Seshagiri Rao, his associate and head of Economics Research Division of the Central Leather Research Institute (CLRI), hailed from a village close to Nayudamma's. One day, he got to know Nayudamma's proposed visit to Yelavarru through the latter's secretary. He got into the act, telephoned his brother-in-law, who was a doctor at Ponnuru, asked him to go across to Nidubrolu station, receive the guest and put his car and driver at Nayudamma's disposal for him to travel to Yelavarru. Rao, of course, was blissfully unaware of Nayudamma's wish that he be left alone in his journeys to Yelavarru.

Nayudamma boarded Howrah Mail at night in Madras and got off the first class coach at Nidubrolu early next morning. He found Dr Chittibabu, Rao's brother-in-law, welcoming him warmly

with palms put together and a broad smile. Nayudamma thought he might have been there to receive a friend or relative. After five minutes, the train departed and yet Chittibabu would not move. Then Nayudamma turned anxious and told him that his guest or relative probably had not been able to board the train. When Chittibabu told him that he had come to the railway station to receive Nayudamma and none other, he was taken aback. Suppressing his irritation, Nayudamma thanked Chittibabu and told him that he preferred to travel by the tonga. Then, like a child, he launched into a long discourse on his love for the countryside. He said he looked forward to the experience of travelling by the tonga on the mud track gazing at the landscape and watching the crops sway to the gentle morning breeze. There was no joy in rushing past all those by car. He would not miss the thrill of watching them for anything in life. He thanked Chittibabu once again and took leave of him, hailing a tonga which had just arrived at the station. He got onto the tonga, made himself comfortable on the coarse blanket spread on the cart and asked the cart man to go. The horse moved in a slow trot. The early morning breeze was cool. The sun broke through the clouds in the horizon.

Nayudamma was on his way to Yelavarru, nostalgic and lost in reverie.

Discipline, determination and devotion are the ingredients of success. Remember, no horse gets anywhere until he is harnessed; no steam-power drives anything unless it is contained and no waterfall is turned into power or light unless harnessed and disciplined.

— Nayudamma

2

CHILDHOOD

Yelavarru is a small village of no more than 200 dwellings, belonging predominantly to Kamma farmers. This was so even in the early decades of the last century. The village is at a distance of 10 miles from Tenali, a very enlightened town, a hub for intellectual and artistic pursuits in the first half of the 20th century. Tenali rightly boasted of being a cultural centre befitting its title, Andhra Paris. During the Freedom Struggle, patriotic fervour reigned supreme in Tenali and the nearby villages.

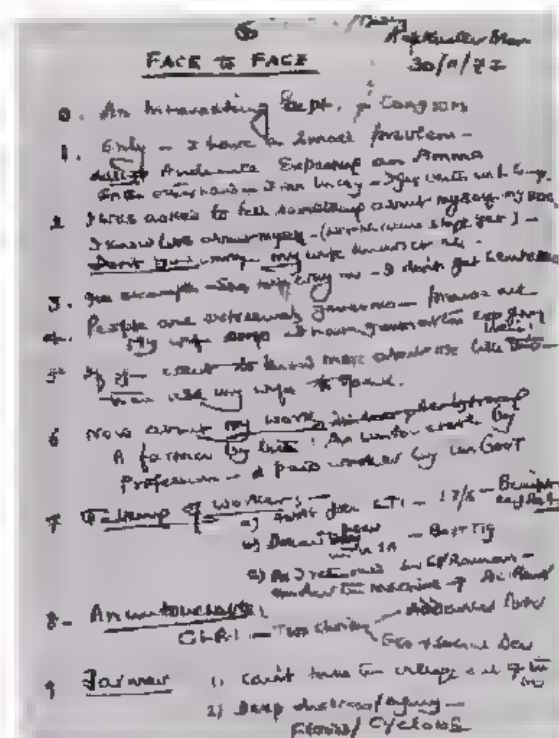
It is not uncommon to find many persons in Andhra bearing the surname of the village they hail from. Yelavarthy Anjaiah was one of them. His was a tiled house, quite small in comparison with the neighbouring houses on either side, which were sprawling, owned by rich farmers. He was a small farmer, owning only 16 acres land. The yield from the land was modest and so were his needs. He was thrifty and so the income was not only sufficient for the needs of the family but also allowed him to save some for the rainy day. Anjaiah was short; his wife Raghavamma tall and beautiful, which is the case generally with men and women of Eepuru Lanka, a hamlet in the upland delta region. She was a pillar of strength of their home. On 10 September 1922, Raghavamma delivered a male child. Two male children and a girl child followed in quick succession over the next few years.



Nayudamma's parents

The first child bore a strong likeness to his mother. Yet it was to his father that he grew closer. Anjaiah christened the boy Nayudamma. The name ended with 'amma', which is a term of address for a girl or a woman. Nayudamma is a peculiar name. Some say it is a term of endearment. Some regard it to be a title 'Nayudu', meaning the head of a group of people, tracing its origin to the Nayakas, who were the governors in the Vijayanagara Empire. In Telugu, Nayudu is a corrupt form of 'Nayaka'. It is a surname in some parts of Andhra, especially Chittoor District. Nayudamma is a first name in Guntur district but not so in other districts. What leadership qualities did Anjaiah notice in his little son is not known but if indeed he expected his son to become a leader, Nayudamma did not disappoint him. He grew tall, literally and metaphorically. He was over 6 feet tall and acknowledged as a scientist par excellence and a leader of great merit. Nayudamma indeed made his father proud, very proud.

Nayudamma who held important positions in life often played on his name, especially in semi formal and informal settings. He would begin his talk or interaction by saying, 'My name has been a cause of much disappointment.' He would pause and say, 'Disappointment not to me but to the audience. They expect an amma to speak when the announcer says Nayudamma is the next speaker. They are disappointed when they find a man, instead of an amma, rising from the seat and moving to the podium. I can't help it.' That is how he began an interview titled 'Face to Face' too with the media in the Max Mueller Bhavan in Madras on 30 November 1977.



Nayudamma was fond of narrating another story to illustrate how his name proved lucky for him. He would place the incident in the mid 1950s. One afternoon, he and two of his colleagues reached Madras Central railway station for their journey from Madras to Bangalore to attend a conference there. They held reservation in the first class coach, the office told them. The three looked at the chart displayed at the railway station. Only two names appeared on the reservation chart. Nayudamma's was not one of them. The other two were worried because Nayudamma was the group leader. Just then the train steamed into the platform from the yard. They looked at the chart pasted on the first class coach door. There also his name was missing. Nayudamma's colleagues now were desperate. It was hot and humid. They began to perspire profusely. In contrast, Nayudamma was unflustered. In fact, he looked remarkably cool. He finished checking the general list and ran his finger down the other lists. His finger stopped at a particular entry and smiled. Then he pivoted around to declare in a flourish, 'Here it is. I am booked in the Ladies' coupe. How nice!' It is possible that he made up this story. Few would doubt it though since he would narrate this with a deadpan expression, even as the twinkle in his eye suggested mischief.

Another anecdote on the same subject is interesting. In 1957, soon after assuming charge as CLRI director, Nayudamma sought an appointment with C. Subramaniam, a minister in Tamil Nadu Government. It was a courtesy call. At the appointed time, his secretary announced on the intercom to the minister that Nayudamma was the next visitor. C. Subramaniam rose from his seat, quickly went to the attached washroom to freshen up. Thus

prepared, he was back in his seat beaming a radiant smile for the visitor when, to his utter disappointment, instead of a woman a tall and thin Nayudamma walked in gingerly. C. Subramaniam himself narrated this incident in a meeting held in CLRI, Madras.

Nayudamma was a happy child. He loved his parents. They doted on him. He was the apple of his parents' eye, his father's in particular. He took delight in going with his father to the agricultural fields. The cattle and the field hands enlivened his spirits. Even when he began to go to the school, his leisure time was spent in the fields, observing how attached his father was to the land and how his father raised the crops with devotion. He helped his father in tilling the land and in tending the cattle.

Nayudamma was affectionate by nature. He had friends in the village from every community. He played with all of them, regardless of their social status. Many of his playmates were from the underprivileged sections of the society. He was completely at ease with the children of all castes and classes.

Throughout his life, he made it a point to visit his village with his wife and children at least once every year. He wore a two-piece suit on special occasions. On other days, he would wear a crisp shirt, trousers and a tie. But much before going to the village, he would discard this attire. He would slip into a dhoti wound tightly around the hips and falling on the ankles, with a loose kurta worn over it and look every bit a typical, traditional Andhra farmer. He would often remark, 'In a village I'll be a villager.' He loved to mingle freely with the villagers, chatting with them until late into the night, behaving as though he was one of them who had never gone away. He liked to go over to the fields, walk on the bunds,

cross the hedges and enjoy the clean air and the dust and smell of the soil. Relaxing on a mat at home with his children, he would turn nostalgic.

Nayudamma's eldest son, Ratheish, recalled how every summer his younger brother, sister and he eagerly looked forward to spending their holidays in the village with their grandparents, who were extremely fond of them. 'My father wanted us to bond with not only our grandparents but also with the villagers, understand the rural ethos, the simple life of the villagers, their food habits, hygiene and the bonhomie with which the villagers lived,' he said.

Nayudamma would always proudly introduce himself as a farmer by birth. He wanted the difference between the villages and the towns to be bridged. He did not like the villagers migrating to the towns and cities in search of livelihood. Rather, he wished the towns to move closer to the villages with technology as the bridge between the two.

He strove for rural development by taking technology to the villages. He firmly believed that technology would be the engine of growth. Whichever position he held and whatever he did, his concern and focus throughout his life were how to benefit the rural population and how to raise their standard of living.

Nayudamma never ceased to be a villager.

Vision is the art of seeing things invisible.

Jonathan Swift

3

SCHOOL DAYS

Anjaiah and his wife were literate. Both could read and write Telugu. They admitted Nayudamma in the primary school. After he became literate, Anjaiah could have asked his son to join him in farming. Had this happened, the country might have produced a progressive farmer but would have certainly lost an eminent technologist and leader of scientists.

Guntur district those days was in the forefront of education. Tripuraneni Ramaswamy, Bar at-Law, had shifted his legal practice to Tenali in 1922. It is from here that he had begun to launch his strident attack on the caste system and the social injustice which the scriptures propagated. He was a towering intellectual whose views on education, religion, and rationalism held sway over the people in a big way. It was due to him that education received a huge fillip in Tenali and the surrounding villages. Inspired by such reformers, even the farmers whose land holding was not substantial were inclined to put their children in school, especially the first son, and if he showed promise, he would be sent to the college for higher education. Their belief was that the first son was the key; he set the tone for the family fortunes. If he did well, he would take care of his siblings and they too would do well in life. It was largely such a belief which influenced Anjaiah to continue Nayudamma's education.

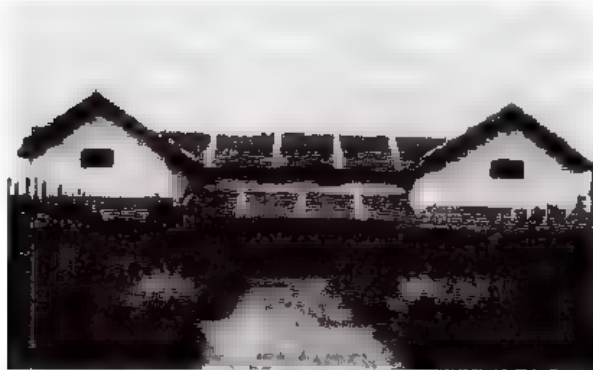
As it turned out, Anjaiah's first son, Nayudamma, did well in studies. His second son, Rajagopala Rao, was a graduate. Nayudamma helped his brother in securing employment but the latter did not settle down in any job and often went without a job. He also let down Nayudamma on one or two occasions. After this, Nayudamma kept him at a safe distance. When Nayudamma was seen helping many others with jobs, Anjaiah, prodded by Raja, asked if he should not be helping his brother. Nayudamma thought for a while and said, 'Father, as a farmer, would you waste your effort and resources like water and manure on a stunted plant which does not respond? Or, on the contrary, would you take care of and nurture a plant which responds well and grows?' Nayudamma would not hesitate to help a deserving person from any caste or class but he kept at bay those who did not deserve his help. That was his nature. After explaining his point of view in the language which a farmer would easily understand, he said, 'Raja doesn't deserve my support. I would rather help those who deserve.' Quite harsh, but he employed such language deliberately so that his father would not raise the matter again. Rajagopala Rao finally took to farming although he was not very successful in this field too. Anjaiah's third son, Radhakrishna, did not study much. He stayed in the village, and cultivated land.

Yelavarru had a primary school in which Yaddapati Sreeramulu, a relation of Nayudamma, was a teacher. He was Nayudamma's first formal teacher, helping him learn the Telugu alphabet and basic arithmetic. Nayudamma was a quick learner. Sensing the boy's enthusiasm, Sreeramulu introduced him to other subjects as well. By the time Nayudamma completed the sixth standard, he had learnt the English alphabet, which pleased Anjaiah a great

deal. Sreeramulu fondly recollected Nayudamma's schooling under him. 'Nayudamma was bright, and willing to learn new things. He was inquisitive and was ahead of his classmates,' he said. 'Nayudamma was very good at maths and science. Even at school, he had demonstrated leadership qualities. He was quite popular in the school.' Was he mischievous and ever punished by the teachers? 'No.' A bully? 'Not in the least. He was actually an adorable child,' the teacher affirmed. 'He was affable but he was intolerant of those who misbehaved with him,' he said.

Soaked in the extravagant affection of his parents and admiration of his teacher, Nayudamma's childhood was one of happiness.

After he completed the sixth standard at Yelavarru, the next step was unclear. The high school was at Thurumella, two and half miles away. Kosaraju Ramaiah Chowdary was the founder of the school. The school was named The Coronation High School since it was founded in 1911, coincidentally the year of the coronation of George V as the King of England. There were only two high schools within a radius of 50 miles of Tenali those days. 'This was one of them and the other was at Tenali. Coronation High School enjoyed a formidable reputation for success with no failures in the Board Exam. The credit for this was given to Pokkumari Dakshinamurthy, head master of the school from 1926 to 1936. Nayudamma's teacher, Sreeramulu, prodded Anjaiah to send his son to Thurumella for further studies. Realising that this was his son's desire as well, Anjaiah enrolled the boy in Thurumella school. In no time, Nayudamma became a favourite student of Dakshinamurthy.



The Coronation High School, Thurumella

Pukkamar, Dakshinamurthy was a dedicated teacher. He was kind to the students, so kind that he would take the children by the boat from Thurumella to Tenali for buying text books and would not allow the children to pay for the books, even if they could afford the cost. For the children, it was like a picnic. They enjoyed the boat ride immensely. Four or five strong men walking along the canal bank would tug the boat by ropes and if the wind direction favoured, they would open the sail. The boat trip by the navigation canal took about four hours. The area had no bus service yet. The ferry was the most important means of transport from Thurumella to Tenali until about 1950.

A small bag of books and a lunch box hung across his shoulder, Nayudamma went to the school at Thurumella. Fifteen other children of the village went to the same school. They would walk until they crossed Yelavarru village boundary, then break into a run along the canal bank, take short cut wherever possible across the bunds of agricultural fields, and reach the school, not a bit

tired in spite of the distance of two and half miles. In the evening too, the drill would be repeated until they reached their homes in Yelavarru before dusk.

Nayudamma often joked about his school education. 'I studied in Thurumella university,' he would say.

Every block of stone has a statue inside it and it is the task of the sculptor to discover it.

Michelangelo

TO VARANASI VIA GUNTUR

As a student, Nayudamma was bright and full of promise. His teacher in the primary school mentioned that Nayudamma had demonstrated a flair for mathematics and chemistry. It was too early for Nayudamma to know about chemistry, much less showing a flair for the subject. It is quite likely that Nayudamma's subsequent achievements and fame as a chemical scientist were the reasons for the teacher's nostalgic recollection. There is little doubt, however, that Nayudamma was inquisitive, intelligent and well-mannered at school.

Nayudamma joined A. C. College, Guntur for the Intermediate education. His father consulted some elders of the village and Tenali, who advised him that Nayudamma's employment prospects would be brighter if he studied science rather than the humanities. Anjaiah did not ask Nayudamma about his choice nor did he find it necessary to do so.

After completing the Intermediate course, Nayudamma went to Varanasi for graduation. Why Varanasi? There is no definitive answer to this. The subject he chose was Industrial Chemistry. There is no clue for this choice either. Banaras Hindu University (BHU), founded by Pandit Madan Mohan Malaviya, of course, was a popular destination for many in Andhra who aspired to pursue higher studies. The elite of Tenali and Guntur considered

it their patriotic duty to send their children to BHU. Nayudamma thought that studying at BHU would elevate his status and get him a job. Besides, he was not the first one to go to Varanasi for higher education. Many from the area had gone there earlier. The choice of the subject however remains a mystery. Maybe he got admission only in that subject. Or else, could it be that his elementary school teacher was after all right when he said Nayudamma had a flair for chemistry?

There is hardly any information about his life and activities in Varanasi and BHU. Baldev Singh, who was a scientist in CSIR, reminisced that he and Nayudamma were co-workers in the student movement for a brief period at BHU. It is doubtful if the student movement had anything to do with the Communists although in a letter he wrote to N. T. Ramarao in 1983, he said, 'I waved red flags in younger years.' Placed in the context, he said he flirted with Communism. When he grew up, he cared for the poor and the down-trodden but to say that he subscribed to the Communist ideology and participated in the activities of the Communists would be far-fetched.

Few details are available about his academic performance at BHU. Probably it was not top class, for otherwise Nayudamma or his colleagues would have mentioned it somewhere in some speech, document or an article. What is known is that in 1942 Nayudamma was awarded the Bachelor's degree in Industrial Chemistry.

The mediocre teacher tells. The good teacher explains.

The superior teacher demonstrates. The great teacher inspires.

— William Arthur Ward

THE TURNING POINT

When Nayudamma returned from Varanasi in 1942 armed with a B.Sc. degree in Industrial Chemistry, he expected to find some employment. But there were no chemical industries in Andhra and hardly any in Madras those days. The degree, therefore, did not fetch him a job. He was bitter and stayed at home in the village wondering what lay in store for him in future. His father was angry that Nayudamma's degree was worthless and that his son had wasted three long years in Varanasi. Nayudamma did not fancy farming as his avocation. His father too would not approve of it anyway.

Legal profession those days was much in demand with lawyers spearheading the Freedom Struggle. Lawyers were also in the forefront of the Justice Party, which had a good following in Guntur district. The popular notion those days was that advocacy was honourable. People looked up to the lawyers to protect their interest and lead them. Yadiapati Venkatarao, Nayudamma's relative and two years his senior, was then studying Law in Madras. Afterwards, he enrolled as lawyer and was successful. Later on, he entered politics and served as a minister in Andhra government. Anjaiah asked Nayudamma to follow the footsteps of Yadiapati Venkatarao and study law. In deference to his wishes, Nayudamma joined the law course at Madras Law College. He did

not stay in the college hostel. Instead, he opted, to cut costs, to stay in a small room in Corner Estate lodge located close to the college. Nayudamma went to meet his relative, who stayed in the law college hostel, almost every evening.

Nayudamma was not even one month into studying law when he realised that his destiny did not involve law. He began to wonder if chemistry indeed was his life. He was a callow youth who did not know what to make of his life. This was a critical period. He found himself at the crossroads. About this time, in a social function, he happened to meet Professor Katragadda Seshachalam Chowdary, who then was the head of Leather Technology Institute. This meeting proved fortuitous. Chowdary was much impressed with Nayudamma's good manners and his countenance and took an instant liking to the young man. When Nayudamma, in the course of a small talk and exchanging pleasantries, told Chowdary that he was a graduate in Industrial Chemistry from BHU, Seshachalam Chowdary casually asked if he would be interested in working for his institute. When it appeared to Seshachalam Chowdary that Nayudamma was favourably inclined to the suggestion, he offered him a job. Nayudamma accepted the offer at once. On 17 June 1943, he joined the Leather Technology Institute as chemistry demonstrator. His salary was only Rs. 17 but he felt good. He had a vague feeling that he had stepped on the first rung of the ladder of success.

After about two months of Nayudamma's admission in the law course, Yadiapati Venkatarao noticed that Nayudamma had not been visiting him as often as earlier and lately he had not turned up at all. This worried him, especially since he also was

Nayudamma's local guardian. So, he went over to Corner Estate lodge to find out what his friend was up to.

When confronted by Venkatarao, Nayudamma poured his heart out. He candidly confessed his utter lack of interest in studying law. When Venkatarao asked what he proposed to do, if not study law, Nayudamma told him about the job he had taken up in Leather Technology Institute. Nayudamma requested him to keep this to himself and not tell his father. He was worried that his father would be upset and offended. Venkatarao understood the young man's predicament but he convinced him that it was an important decision and it would not be proper to keep his father out of it. He assured Nayudamma 'Don't worry much. Trust me to convince your father. Let's go and talk things over.

They both went over to Yeavarru and broke the news to Anjaiah, who, as expected, was hugely upset and agitated, not at Nayudamma giving up the study of Law but on knowing that his son had settled for such a lowly job. He had nurtured the hope that his son would become a lawyer and take care of the family. His face showed acute disappointment and distress. Venkatarao explained to him that this was just the beginning and Nayudamma's future would be bright. Nayudamma too assured his father that he need not be anxious; his was like a government job which assured security with regular increments and promotions and soon he might even be of some financial support to the family.

Anjaiah was mollified and let go Nayudamma.

Nayudamma knew how to make the best of the opportunity that came his way. He was not bothered about his low salary. He

knew the job allowed him growth. Seshachalam Chowdary was impressed with Nayudamma's dedication to the job. His sincerity appealed to him so much that he allowed the young man to liaise on behalf of the institute with Madras government departments. Nayudamma seized the opportunity with both hands. In time, he became Leather Technology Institute's unofficial spokesperson.



Prof Seshachalam Chowdary

When Nayudamma was making rounds of the Madras Secretariat on the institute's work, P. V. Krishnaiah Chowdary who was pro-British but a public-spirited and an influential leader in Guntur district, spotted him. Krishnaiah Chowdary visited Madras frequently in pursuit of his mission to establish schools and hospitals in Guntur district. He spoke a strange mixture of Telugu and English while dealing with non-Telugu speaking people. The British officers, in particular, often found it difficult to follow his 'working' English and this gave rise to a communication gap. When Krishnaiah Chowdary found that Nayudamma was good at speaking English and well-mannered, he began to take Nayudamma along, almost like his pageboy, when he called on the British officers. These meetings exposed Nayudamma to the elite bureaucrats. He was fascinated by the authority they wielded and the kind of impact their decisions had on the people. He admired

Krishnaiah Chowdary, who raised donations for starting schools and hospitals, especially from the rich widows assuring them of eternal fame, and then raised with the government for matching grants and approvals. He succeeded in establishing as many as 23 high schools and 36 primary hospitals in Guntur district in just one year— not a mean feat

With his amiable nature, Nayudamma developed excellent contacts at all levels in the government. Enthused by the confidence that P. V. Krishnaiah Chowdary and Seshachalam Chowdary reposed in him, he began to interact with the bureaucracy almost on even terms. The departmental heads took a special liking for him and began to trust and rely on him for advice on the leather industry and matters pertaining to the Leather Technology Institute. Nayudamma also assiduously cultivated many important tanners of Madras. It looked as though the field of public relations was his forte.

That his salary was little did not bother Nayudamma. His low official status also did not matter to him. What counted for him was his importance in the institute. His influence on the institute's director and in the government departments with which the institute had to deal with for approvals and sanctions was enviable. P. V. Krishnaiah Chowdary's success propelled Nayudamma to dream of being a decision-maker in the government some day. But he could not be part of the civil service, having crossed the age limit to take the exam. The next best was to be a scientist and hope to head a research institute. His association with Krishnaiah Chowdary and support of Seshachalam Chowdary to him made Nayudamma believe this a possibility

His job, though nothing much to boast of, opened many doors for Nayudamma.

*I keep six honest serving men
(They taught me all I knew)
Their names are What and Why and When
And How and Where and Who.*

Rudyard Kipling

MARRIAGE

Early marriage was the norm those days. But Nayudamma had not shown any inclination for early marriage. His father too was averse to the idea of performing the marriage of his son until he settled down well in life. When Nayudamma turned twenty-three years of age with a secure job, his father thought it was time to get him married. In 1945, his father proposed Nayudamma's marriage with Sitadevi, belonging to Velaturu, a village not far from Yelavarru. She was the only child to her parents, who were well to do. Sitadevi's father married a second time for he was keen to have a son but he tied the knot after his daughter's marriage and her departure to Madras. When his second wife too failed to beget a son for him, he married again. Through his third wife, he had male children and so his property devolved on them rather than Sitadevi's children.

When his father brought up the marriage proposal, Nayudamma had no reason to shy away from it and consented.

Soon after the marriage, life took a turn for Nayudamma. In 1945, the Leather Research Committee of CSIR recommended that it was essential to establish a Central Leather Research Institute in Madras if India was to develop the leather industry on the same lines as the industry in Europe and America. As part of

capacity building in leather research, Seshachalam Chowdary, who himself had been educated in Britain, proposed to the government to depute one person to England for training in leather technology at the famous Leathersellers' Technical College, London. Seshachalam Chowdary, who was thoroughly impressed with Nayudamma's aptitude and brilliance, did this to help his protégé. When the Madras Government accepted the proposal and asked Seshachalam Chowdary to suggest a suitable candidate, he promptly nominated the young man. Nayudamma's benefactors in the government were only too happy to approve his nomination. He had to sign a bond that on completion of his training abroad he would return to the country, rejoin the parent institute and serve it for a minimum period of two years. Everyone nominated by the government for training abroad had to sign such a bond. Nayudamma executed the bond without a second thought.



Nayudamma with Sitadevi (second from left sitting)

Nayudamma was married only recently. He was unhappy and resentful at the idea of separation so soon from his impressionable young bride. He would have liked to take his wife along to Britain but his allowance was meagre and he had no private means to supplement it. He would have to go alone. Not once did it cross his mind that he would miss this opportunity of overseas training because of his wife or any other reason. He justified his action of going abroad alone saying that many a married person from Madras and Guntur earlier had gone abroad for long years for study or employment. He was not the first one to do so.

Nayudamma did not want his wife to return to her parents during his overseas training. Durgabai Deshmukh had founded Andhra Mahila Sabha where women were being coached to take the Matriculation Exam in Varanasi. He was aware of this. He wanted his wife to study while he was away in Britain. He convinced her that his training abroad and her education in Madras would be beneficial to both. She had no choice. He admitted her in the hostel attached to Andhra Mahila Sabha where she would prepare for the Matriculation Exam privately.

In 1946, when Nayudamma set sail to England alone, leaving his young wife behind, it appeared as though his marriage started off on a disappointing note.

The secret of success is constancy to purpose.

— Benjamin Disraeli

TO AMERICA VIA LONDON

When Nayudamma left India for Britain for a year's training, he had imagined he would return to the Leather Technology Institute to take up the same job, probably on a small increment, and in due course become a part of the proposed CLRI. In the closing months of his stay in England, however, it dawned on him that his training in Britain was of little consequence. It was more like an academic diploma, theoretical in nature and had no practical application in India. It did not add value to his professional qualification or skills in any manner. He was frustrated.

He was not a regular student to be content with a diploma. Having come from the industry with previous work experience, he expected a lot more than another diploma, especially in the direction of acquisition of skills. Through his teachers at Leathersealers' Technical College he became aware that M.S. in leather technology in the U.S.A. would equip him with the technical knowledge and skills that would have relevance and application to the leather industry in India. He yearned for such experience. He made up his mind to explore the possibility of going to the US. He identified Lehigh University for pursuing the Master's degree. He submitted an application to the University in a rush and simultaneously sent applications to the Leather Technology Institute asking for education leave and to Madras government requesting for study allowance.

Lehigh University accepted his application. This was expected. The harder part was approvals from India. Seshachalam Chowdary, ever his unfailing benefactor, supported Nayudamma's application. His excellent equation with the bureaucrats in Madras government once more proved a blessing for him. The approvals from Madras were received just in time. He rushed to the U.S.A. before the academic session began at Lehigh University. He had no time or money to visit India and so he left for America from London without coming home.

During the years 1947-49, nine Indians pursued postgraduate studies at Lehigh University. Of them, Nayudamma, Rajagopala Rao, Vasant Pandit and Chaudhury studied Leather Technology course. Rajagopala Rao returned to India without completing the course. Chaudhury from then East Bengal went on to become the founder of the leather research institute of Bangladesh.

Not much is known about Nayudamma's life in Bethlehem, Pennsylvania. S. R. Valluri, who studied in the U.S.A. and who in the late 1960s headed Aeronautical Development Agency, Bangalore, heard of Nayudamma for the first time in 1949 when Dr Robert H. Kortege, his colleague in CALTECH, asked him if he had known Nayudamma. Valluri had not. Bob Kortege had studied in Lehigh University. Bob Kortege and his wife Michele prompted Valluri to find an occasion to meet Nayudamma since, in their judgment, he was one of the outstanding persons they had met from anywhere in the world. Such praise of Nayudamma by his American contemporaries might not appear lavish now but coming as it did in 1949, when Nayudamma was just a student, it was indeed significant.

Nayudamma was gregarious, and mingled freely with the local population. He was a popular speaker not only in the college but outside too. Bethlehem's Brown & White newspaper of 2 March 1948 carried the news pasted below.

Nayudamma Speaks On Indian Problem

Yelavarthy Nayudamma, a graduate student in chemistry, told members of Alpha Phi Omega about his native India at a meeting last Monday night. August Wigand, president of the national scientific service fraternity, announced that Mr. Nayudamma's was the first of a proposed series of student lectures.

Mr. Nayudamma traced the growth of India, commenting upon the British rule, independence, the separation of Pakistan, and the present Indian strife. He emphasized some modern Indian social and religious practices and India's industrial potential.

After his speech, questions were raised concerning Gandhi and the universities of India.

Mr. Nayudamma, who was contacted through the Cosmopolitan club, has studied in India and England. After receiving advanced degrees from Lehigh, he plans to return to India to enter the government service.

The scant material available on his life in Bethlehem suggests that Nayudamma was quite popular with his class fellows and he had a good number of friends outside the University. He had established contact with the Indian Embassy in Washington and

Nayudamma with colleagues at Lehigh University

Did Nayudamma adopt a western life style? Unlike, considering his modest means His western dressing habit of wearing a two piece suit was acquired during his stay abroad.

While delivering the convocation address of the IIT, Madras, he mocked at himself. 'I have not been able to understand till today why I should wear a western style dress and shoes, in a tropical city like Madras. Is it to show that I am westernised or that I have been trained in the West?'

Nayudamma was not a 'bench scientist'. He was inclined more towards practical science than theoretical; applied than basic. Tannery is the best example of 'dirty hands approach'. No other industry typifies this more than tanning. Nayudamma also knew how science and technology had been the reason for the sharp rise in the standard of living in the developed countries. He was not content with his laboratory knowledge. He wanted to know how science and technology translated into practical work in the factories in the U.S., how the linkages were established between research and production sectors and how the research results reached the industry. This knowledge would prove valuable for him and his area of work in India, he thought. He wanted to extend his stay in the U.S. in order to work in the local leather industry. However, his permit to stay in the U.S. was about to end.

Nayudamma approached the Indian Embassy in Washington and with their help he got the stay extended. Then he worked in Frebreuping Co., Boston for a few months. Later on, he joined S. B. Foot Tanning Co., Minnesota, established in 1872, learning on the shop floor how technology worked. This exposure was invaluable; it made him understand how technology helped the local leather industry. He gained insights into the manufacture of various kinds of leathers. In later years, he reflected on his life in the U.S. and described his work experience there as the best training he ever received.

In the 1950s, the first generation of doctors and engineers from India were then going to the U.S.A. for employment, chasing the American dream. He was not attracted to be a part of that group. Nayudamma did not seek regular employment in America. Probably, the pull back to India was very strong, having been attracted by Prime Minister Nehru's encouragement for science through the establishment of a chain of research institutes which Nehru described as 'The temples of modern India'. Nayudamma's love of his parents also must have influenced his decision. Besides, he could not imagine getting away from the undertaking he had given to the government of returning to the Leather Technology Institute and working there for a minimum of two years after completing his training abroad. Moreover, in 1949 itself he had unequivocally declared his intention of returning to India after the studies to join government service, and his resolve remained firm and unwavering.

S. Raja, Editor of *The Tanner*, recalled his visit to Rome in 1957 to attend the conference of International Union of Leather Chemists. He made his acquaintance with Nayudamma there. In later years, he recollected that Nayudamma was fresh from his U.S. experience and was en route to India to take over as Deputy Director of CLRI. Raja's memory apparently failed him in this matter since Nayudamma had returned to India in 1951 and by 1957 he had already spent six long years as a scientist in CLRI. There can be little doubt that Raja would have met Nayudamma in 1957 in Rome when the latter, in his capacity as the acting director of CLRI, attended the Chemists Conference in Rome.

There is a story that suggests that Nayudamma chanced upon

S. S. Bhatnagar in Rome and the latter took him out for dinner and asked him to return to India to serve CLRI. This is not believable because Nayudamma first visited Rome in 1957 to attend a conference. Moreover, he had not harboured the thought of staying in America. He was always keen on returning to India and work for the government. Besides, he had to honour the bond executed before he left for the training abroad. But while delivering Bhatnagar Memorial Lecture in 1983, Nayudamma acknowledged that Shanthi Swarup Bhatnagar was his benefactor and well-wisher and that it was he who brought him back from abroad to establish CLRI.

S. S. Bhatnagar was from the field of industrial chemistry. He was a professor at BHU for some years and later the Punjab University, Lahore when in 1940 Sir Ramaswami Mudaliar, the Chairman of the Board of Scientific and Industrial Research (BSIR), persuaded him to accept the office of Director, Scientific and Industrial Research. Nayudamma had known S. S. Bhatnagar, their Industrial Chemistry background being the common bond between the two. Besides, Nayudamma had the knack and inclination for cultivating people. Bhatnagar was also always on the look out for promising scientists and technologists, having accepted the mandate of Nehru to establish a chain of national research laboratories. By 1945, the CSIR, successor of BSIR, had appointed twenty research committees. On 1 December 1943, the Leather Research Committee had been constituted under the Chairmanship of Rai Bahadur B. M. Das. On the recommendation of this Committee, CSIR financed leather research in Leather Technology Institute, Madras with a yearly grant of Rs.60,000 and

shortly thereafter established CLRI. Nayudamma was probably the first Indian scientist with a Ph.D. in leather technology and Bhatnagar knew that CLRI required the services of competent technologists. Bhatnagar must have spotted Nayudamma when he was working in the U.S.A. and asked him to return to India assuring him a bright future in CLRI.

Nayudamma returned to India in the latter part of 1951 to pursue his career as a leather scientist.

Opportunities are usually disguised as hard work, so most people don't recognize them.

— Ann Landers

THE STORY OF A GARDEN

The CLRI commenced its activities in April 1948 in a rented premises adjoining A. C. College of Technology. A.C. College had the distinction of being the first institute in India to start a degree course in leather technology. After CLRI came into being, A. C. College which was then attached to Madras University and CLRI began to jointly conduct graduate and postgraduate degree courses in leather technology. Professor Seshachalam Chowdary, head of the Leather Technology Institute, was appointed by the government as the special officer of CLRI.

In his speech on the occasion of the foundation laying ceremony of CLRI on 24 April 1948, S. S. Bhatnagar said, 'The idea of having this Institute at Madras was conceived as far back as in 1945 but for reasons beyond our control it could not take concrete shape earlier ... The Government of Madras has promised to place at our disposal free of cost a site measuring about 200 acres ...' In the final reckoning, the site allotted for CLRI, however, measured only about 80 acres. It was Sir Lakshmanaswami Mudaliar who prevailed upon Madras Government to allot the land for CLRI in Adyar. The proposed site for the institute was next to a posh locality. The decision led to noisy protests by the residents of the area who feared pollution. Despite this, the decision was not

changed and the institute came up in Adyar during 1948-1952. Dr Sundara Rao was the second special officer who served the institute from January 1951 to September 1951. The mantle passed on to Professor B. M. Das in September 1951. By late 1952, CLRI had two buildings— one housed the tannery section and other the administrative office.

Inauguration of the campus on 15 January 1953 was a momentous event for CLRI. T. T. Krishnamachari, Industries Minister in Nehru's Cabinet, was to declare the campus open. A few days before the event, Nayudamma went round the campus, spread out in 80 acres, which looked bare except for the two unostentatious buildings. He was dejected. He knew the campus would send negative signals to the minister and other visiting dignitaries. Something had to be done quickly. His out of the box thinking showed him the way. There was no time to be lost. He used his contacts in Madras and scooped up from somewhere fully laid lawns, got them moved to the campus and fixed them around the two natural ponds. After sprinkling water, the lawns looked healthy, as if they were there for a number of months. He got some fruit-bearing and many shade-giving trees uprooted from the ground from elsewhere and had them transplanted in neat rows in CLRI campus. The trees looked fully grown and appeared to belong to the campus naturally.

The minister, other visiting dignitaries and the guests, who went round the campus, were impressed with what they saw. They showered wholesome praise on the management for their foresight in raising such a beautiful garden.

T. T. Krishnamachari cut the ribbon ceremonially, declaring the campus open.



Innauguration of CLRI (1953)

The event was a huge success and Nayudamma came for a lot of praise for the arrangements made. This bred jealousy among some people. CLRI's administrative officer by name Govindachari was a petty man and inimical to Nayudamma. He snitched to B. M. Das that Nayudamma had grown too big for his shoes, that perhaps he overshadowed Das. He needed to be humbled and there was a small matter which provided such an opportunity. He had not taken the director's approval for buying the lawns and the trees and so Das sahib would be quite right in refusing to sanction the expenditure.

B. M. Das was happy that the minister's visit was a big success and that CLRI's stock had gone up considerably in public esteem. But that Nayudamma probably had hogged the limelight caused him disquiet. Therefore, when the wily Govindachari suggested

that Nayudamma be shown his place, Das swallowed the bait. He summoned Nayudamma to his chamber and told him that he had gone and purchased the lawn and the trees without his approval and so he was constrained not to sanction the expenditure. This was like a bolt from the blue. Nayudamma was furious. He had gone out of his way to ensure that the inauguration was a grand success and here was a director who, instead of paying him handsome encomiums, was teasing him and talking of not paying the bills. He raised his voice, which was quite unusual for him, adrenaline rushing, he said, 'Fine. I will pick up the tab. Take it as my personal contribution for the improvement of the campus. Thanks anyway for giving me the opportunity of serving CLRI this way. He snatched the bills from Das, tore them off and stomped out. The plants and the lawns had cost him Rs.400, a princely sum those days, which he did not have. In the event, his father helped him with cash.

Nayudamma laid the garden in CLRI campus initially for a specific purpose but, in course of time, the garden acquired its own identity. CLRI, which had come up in Adyar amidst protests, became an important landmark in Madras for its beautiful garden and various leather training and research units. Visit to CLRI became a part of the educational tours of college and school students. The itinerary of Central and State ministers and world leaders visiting Madras included a trip to CLRI. 'Every visiting dignitary is taken to the old stone carved temple in Mahabalipuram and CLRI, the "modern temple" as Nehru put it. Nayudamma would say proudly

The bonding between Nayudamma and the garden gave rise to

a ritual in CLRI. Every morning, the senior gardener would collect a bunch of flowers, wait at the entrance of Nayudamma's office, flowers held in his outstretched palms, and offer them to Nayudamma as soon as he reached office. Nayudamma would accept the flowers gracefully and pat the gardener's back affectionately. This was a ritual which the gardener and Nayudamma looked forward to everyday. When Nayudamma left for Delhi in 1971 to head CSIR, in the farewell function, a mention was made of the trees in CLRI campus also bidding him farewell.

After Nayudamma left CLRI, the garden was somewhat neglected. Nayudamma noticed this in 1974 when he camped at Madras. He asked Santhappa, director of CLRI, about the state of the garden. 'The first thing that attracts a visitor is the garden. If the garden is in a bad shape, he would never go away with a good impression about the institute,' he told him. Santhappa who was tied up with research work and administration of CLRI called Seshagiri Rao of economics research division and said, 'Nayudamma is berating me for the poor maintenance of the garden. I have no time to attend to the garden. Being a farmer's son, I believe you are best suited to supervise garden maintenance. Please do something about it.' Rao accepted the responsibility.

The garden tested the perseverance and imagination of Seshagiri Rao. He took the gardeners into confidence and made them work hard. He got 20 truckloads of good manure to enrich the soil. He added many new plants to the stock. He got exotic rosebushes planted in the garden. The garden was lush green. It turned out to be one of the most beautiful gardens of Madras within a short period.

For many years, CLRI inmates were in the habit of plucking tiny raw mangoes for making chutney. Rao put an end to this. The incentive he gave to the gardeners to see that the mangoes remained on the trees until they were ripe was that they would be entitled to have the fruits free and that only after they had their fill would the balance fruits be sold. They liked the incentive and guarded the mangoes until they were fully ripe. They took their share and the surplus mangoes were sold in the campus to CLRI staff—20 large, succulent mangoes for just one rupee—and the proceeds were used to buy manure for the garden.

Looking at the way the garden had come up, someone asked Rao if he was a trained horticulturist. 'Being a farmer's son, I can raise a garden without any formal training,' he replied. Thanks to his care, the garden looked so exquisite that the Madras Horticultural Society selected it as the best garden in Madras for some years. Two of NTR's films were shot in the campus but afterwards film shooting in the campus was not allowed: the noise and the crowds were quite a nuisance.

Over the next eleven years, whenever Nayudamma and his wife were in Madras, they would take a leisurely stroll in the campus in the evening, enjoying the cool environs. The small trees planted by Nayudamma grew into huge trees giving shade and fruits to the staff and the birds in CLRI campus. Nearly 60 years later, they are still recognised as Nayudamma's trees.

Nayudamma's legacy continues.

Don't judge each day by the harvest you reap but by the seeds that you plant.
— R. L. Stevenson

STILL AN UNDERSTUDY

Nayudamma returned from America in December 1951 and assumed charge as an assistant director in CLRI. He was the first Ph.D. holder in leather technology in the country and he was proud of the appellation. But assistant directorship was too low a position for a person who held a Ph.D. in leather technology and who had work experience in America. But the anomaly was removed with his promotion as deputy director a fortnight later. This made him happy. The work culture in the country however bothered him. It did not take long for him to realise that, in striking contrast to the U.S.A., leather research in India was assigned low priority. The scientific community in the country neglected leather research reckoning it as application-oriented impacting a lowly industry. He was a believer in 'dirty hands and decent minds' but he had to painfully note that there was little support for his belief among the Indian scientists.

Nayudamma was keen on making a difference but the special officer, Rai Bahadur B. M. Das, did not share his enthusiasm. Das was a good man and well respected in the field of leather research. He had studied in England. He was British in his dress, manners and approach. He was stiff, terribly hierarchy conscious and would deign to speak only with the senior officers. Nayudamma was the complete opposite. He was gregarious and outgoing, mingling

with everyone, high or low, and radiating warmth and energy. He would go all out to reach everyone among the tanners, especially the poor. He treated the employees of CLRI and their family members as part of his extended family. Das actually nursed a grievance that CLRI had not been located in Calcutta. Syama Prasad Mookerjee, then Supplies Minister in the Central Government, tried his best to have the institute set up in Calcutta but failed, thanks to the vision and power of the personality of Sir Lakshmanaswami Mudaliar who persuaded CSIR to establish CLRI in Madras. Ironically it fell to Syama Prasad Mookerjee's lot to lay the foundation stone for CLRI in Madras on 24 April 1948. It appeared as though Das did not easily warm up to any research proposal which had anything to do with the leather industry in Madras. The attitude of Das caused much anguish but Nayudamma did not lose heart.

Right from 1943, Nayudamma was closely associated with the problems of the tanners. The tanners, mostly drawn from the under-privileged sections of the Hindu and Muslim communities, were illiterate. They used conventional and crude methods for tanning. Use of chemicals was not known to them. There were exports but of only raw hides. Nayudamma was not the one to be happy with producing only research papers. He was keen on technology transfer. Even though he did not have much support for his initiatives from Das he made strenuous efforts to see that CLRI established effective liaison with leather industry. It was service through research that motivated him. 'He linked the products of CLRI with the life of the people he strove to serve. He built a social contract to his research and developmental activities,' said T. Ramasami, director of CLRI and later Secretary, Department

of Science & Technology.

Since Nayudamma's research activities did not occupy much of his time, he began to look at teaching seriously, trying his hand at teaching leather technology for the students of Madras University. He found the interaction with the young minds invigorating while the students warmed up to his innovative methods of teaching. His classroom sessions were closely aligned with the research carried on in CLRI. He also encouraged students to visit the tanneries. Lakshmanaswami Mudaliar, the Vice-Chancellor of Madras University, was so impressed with Nayudamma's classes that in 1956 he appointed Nayudamma as Honorary Professor of Leather Technology. Nayudamma had an abiding faith in the university system. He firmly believed that knowledge required to be universally disseminated and that a scientist should not only carry on research but also pass on his knowledge and experience to the students who would be the scientists of the future.

Even as a young scientist at CLRI, he had built up awesome reputation as one who would extend a helping hand to the needy. Researchers in other institutes also were aware of this. G. N. Ramachandran who then wished to conduct experiments on collagen structure was struggling to source collagen for his study. How to get collagen was indeed a big problem for GNR at that time. When he moved to Madras in 1952, he heard about Nayudamma. He met him and presented his problem. Within a few days, Nayudamma procured one tube of collagen from Australia. This helped GNR to carry on his research and publish in 1954 the first innovative paper on collagen structure, which gave strikingly original triple helix and GNR was immortalised

for this discovery. On many occasions, GNR acknowledged his debt to Nayudamma for helping him in his path-breaking research. When CLRI held a seminar on collagen in 1960, GNR was happy to participate in the deliberations. Whenever the scientific world mentioned the benefits of collaboration in research, often a mention is made of Nayudamma's role in the Triple Helix discovery. The Triple Helix Auditorium in CLRI is a living testimony to the collaboration between GNR and Nayudamma in collagen research.

By the year 1955, B. M. Das had completed his term as director of CLRI. The government was on the look out for someone to succeed him. Since the government could not identify a successor immediately, Das was given extension for one year. Das had hoped that Bharat, his protégé from West Bengal, a scientist like Nayudamma, would take over from him. During the period of his extension, Das suffered a stroke in September 1956 and passed away. Nayudamma, 34 years old then, was asked to take temporary charge of the Institute. Bharat, whom Das had patronised, was not considered for the job. It must be said to Nayudamma's credit that he held no grudge against Bharat. On the contrary, he was generous to him and treated him with unusual consideration during his stewardship of CLRI. In fact, he helped Bharat in going to IACI where he pursued a happy and fulfilling career.

Nayudamma seized the moment of his *ad hoc* appointment as director to unveil his vision for CLRI.

Science is to be judged by its excellence; technology by its contribution to social and economic development.

— Nayudamma

TESTING TIME

Nayudamma's appointment as CLRI director in September 1956, though on temporary basis, made the scientific community look at the young man, still in his early 30s, incredulously and with a lot of scepticism. He now had the responsibility of not only achieving the objectives of CLRI but also achieving them quickly so as to prove to the sceptics that his appointment was not a fluke or a mistake. He began to work with missionary zeal.

With no one breathing down his neck and stifling him now, Nayudamma began to reorient CLRI. He knew CLRI had to work for the advancement of Indian leather industry through research and development and through actual introduction of the technological inventions of CLRI scientists.

Nayudamma was a villager at heart. His specialisation in leather technology brought him in contact with the village cobbler and the untouchable lowest castes who skinned the dead animal. He knew the sub-divisions among chamars. The butchers and flayers were at the lowest rung, then raigars who made leather, khatiks who tanned leather and mochis who made and repaired footwear. The cremation ground and the tanning community were kept at a distance, usually to the north of the village, to avoid foul smell, as usually the wind direction is from the south and the east. Chamars were treated as untouchables because of the bad odour

associated with their work and the work was dirty. Mochi within the caste was superior because footwear making was a cleaner job than that of tanners and flayers. Nayudamma was conscious that the stigma attached to the industry was because of bad odour and effluents. The living and the working conditions of the artisans were appalling. He felt as though the key to the social change was well within his grasp.

The leather industry in India had been very primitive and traditional and remained the same for centuries. Modern methods of tanning and use of chemicals had not reached them. Nayudamma thought the best way would be to utilise the traditional skills, expose the artisans to modern methods and induce them with better returns for their products. He also envisioned higher wages to the workers through modern management and marketing methods. Development of Indian leather industry for Nayudamma meant not only economic and industrial development but also social development. For him, growth included social justice and the stigma of untouchability ought not to have any place in any modern society.

He had so much clarity on what to do, how to do it and with what results but he did not impose his views. He wished to build consensus around his views among the scientists of CLRI. So, within a few months of being in-charge director of CLRI, in early 1957, Nayudamma held a series of brainstorming sessions with the colleague scientists. He asked, 'What is the role of CLRI?' This was easy, to help advancement of the industry. His next question: 'What is the present condition of the industry?' This too was simple. It existed in cottage, small, medium and large sectors.

'What is the contribution of the large sector?' It was 10 to 15% of the total production. 'What has to be done to take the industry forward?' The response of the scientists, 'Modernise the industry,' appalled him since this implied shutting down or merging of uneconomic cottage and small units and, in their place, establishing organised and mechanised units on modern and scientific lines. Nayudamma posed the problem of traditional workers, 'What will happen to the millions of village, household traditional workers?' The leather scientists said, 'Let them seek other jobs.' Nayudamma nodded his head and asked, 'But where? And with what skills?' There was no answer.

Nayudamma was a solutions man. He now came out with his views on what CLRI could do. 'Why not make use of the age old experience and skills, improve upon their tools and techniques, improve their living and working conditions and increase their economic return?' he said. These were still a series of questions for the scientists to ponder over. He wanted the scientists to realise that the alternatives had merit and wanted them to recognise it. Now he placed bad odour as the culprit. 'If science and technology were any good, suitable methods must be found for treatment, disposal or utilisation of effluents,' he said. He explained his vision of technology helping social development by removing or reducing bad odour involved in tanning and thereby removing the stigma attached to the industry and attracting people from the high castes to the industry. The scientists were convinced that Nayudamma's suggestions indeed had merit.

The agenda of CLRI was set

CLRI carried out surveys into the age-old practices, to

appreciate the science behind them, improve upon them and take the improved methods to the tanners in remote villages. Any amount of publicity would be of no avail. Being passionate about leather industry, he realised that technology had to be taken to the doorsteps of the tanners. They would not seek technology because they were complacent, fairly satisfied with the existing processes and markets. He knew they would not yearn for any research results. They also would not voluntarily seek CLRI's assistance. So, instead of the industry seeking a helping hand from the scientists, the research results needed to be taken to the tanners to demonstrate their efficacy. This would make the research relevant. To serve this objective, Nayudamma hit upon the idea of extension workers.



Nayudamma with CLRI Scientists at a tannery

The extension workers of CLRI would live in the villages and demonstrate the use of know-how. This was labelled as show-

how' of 'know how'. Nayudamma's instructions were that they would work unobtrusively and move slowly to create initial confidence before introducing newer and better methods. The tanners were not to be disturbed. While they worked as usual, the extension workers would unobtrusively urge the cottage tanners to use CLRI medicines contained in two packets. The yellow packet was to be used on Friday and the white packet on Sunday in the traditional method of tanning. Then the tanners were asked to see the difference the packets made to the tanning processes. The tanners quickly noticed the difference: production of better quality leathers and in a shorter period of time. These methods were simple but ingenious and extremely effective in transferring technology. With bad odour removed, costs reduced and incomes enhanced, the tanners were now open to accept CLRI's other complicated tools and techniques.

Nayudamma had kept his ear to the ground. He realised that the extension work was the key to transferring the research results. He therefore laid special emphasis on extension work by posting one of the best technologists of CLRI to this wing as in-charge and allocating 30% of CLRI's budget to this activity. This resulted in quick and effective transfer of research results to the leather industry.

Nayudamma was appalled at the management practices followed in the institutes. He was aware that most of the directors of research laboratories, drawn from research and academic institutions, had never been trained for managerial roles. 'Like instant coffee, they become instant managers,' he said. He knew the vital role of management training in research institutes.

Therefore, in the Directors' Conference held in 1956, he ventured to suggest that CSIR should seriously consider deputation of the directors of research institutes for training in the area of research & development management conducted in Boston. He thought it was a felt need of the institutes. This was an excellent suggestion. He was not a director, holding only temporary charge as director, and yet he was emboldened to air his view on the subject. He expected that the suggestion would be well received, if not for its intrinsic merit, for the reason that the place of training he suggested was Boston. But he was proved wrong. His advice fell on deaf ears. Two directors sitting on either side of him in fact ridiculed the idea. They derisively said, 'Thank god, we at this age are not asked to learn how to cough.' In the event, Nayudamma's well meaning proposal of training the directors of national laboratories in management was trashed.

Even when Nayudamma held temporary charge of CLRI, his organizational skills were in full display. They were noticed and acclaimed when ECAFE Workshop on Leather Technology was held in Madras in 1957. CLRI and Madras Government had hosted the workshop. Nayudamma was very considerate and had the social grace that was necessary to win the hearts of both the foreign and Indian delegates. Leather chemists and technologists from all over the world who participated in the workshop were greatly impressed and openly praised CLRI and Nayudamma. R. Venkataraman, then Tamil Nadu Industries Minister and recognised as the father of industrialisation of Tamil Nadu, had played a major role in bringing the workshop to Madras. He was touched by the encomiums paid to CLRI as well as to

Nayudamma by the foreign delegates. He happily acknowledged: 'These words make me feel inches taller.'

Nayudamma proved his sceptics wrong. His success showed that he was mature beyond his age.

If a man is called to be a street sweeper, he should sweep streets even as Michelangelo painted, or Beethoven composed music or Shakespeare wrote poetry. He should sweep streets so well that all the hosts of heaven and earth will pause to say, 'Here lived a great street sweeper who did his job well.'

Martin Luther King Jr.

A MOMENTOUS MEETING

Prime Minister Jawaharlal Nehru was a strong supporter of science. He envisioned an India free from superstitions and poverty. He was keen to use science and technology as a vital instrument in solving India's socio-economic problems. His vision enabled him to spot the leaders of science such as Shanti Swaroop Bhatnagar, Homi Bhabha and Vikram Sarabhai who laid strong foundations for the development of science and technology in the country. Bhatnagar was the first Director of the Council of Scientific and Industrial Research, which became the crucible of research in independent India.

Nayudamma was a great admirer of Nehru. He knew that it was Nehru who created the scientific climate in the country. He was also aware that Nehru's bias towards strong mission-oriented research was a product of utilitarian views on science. Nehru could easily mobilise the scientific community, particularly the higher echelons, in support of a national thrust for science and technology. The scientific community in return found in him a protector and promoter of its interests.

This was the backdrop in February 1958 when Nayudamma's name was considered for appointment as director of CLRI. At 35 years, he was still too young to head a national research institute

No one had ever been appointed as director of a national laboratory at such a young age. But there was no other leather technologist who had better credentials than him. His *ad hoc* term as the director was eventful and his leadership qualities were noticed and recognised by the government, scientific community and the leather industry. His contacts too helped. Prof. Thacker, DGSIR, was fond of Nayudamma and had faith in his ability to lead CLRI despite his young age. He proposed Nayudamma's name for the job. Vijayalakshmi Pandit, mother of Vasant Pandit, his classmate in Lehigh University, put in a word about Nayudamma to Nehru. Nayudamma treated Sir Lakshmanaswami Mudaliar as his guru and in turn Mudaliar was extremely fond of Nayudamma. Mudaliar was the chairman of the executive committee of CSIR and he supported Nayudamma for the post. The decision was made. Nayudamma was in CLRI at the right time. Fortune favoured him despite his young age.



Nayudamma, Thacker and Lakshmanaswami Mudaliar

But Nehru was besieged by doubts. His science and technology initiatives were beginning to be questioned. He wanted science to help the nation but ten years of investment had not yielded any tangible results. It was common sight in Delhi when Nehru would hop into the car and drive to National Physical Laboratory with S. S. Bhatnagar frantically following behind. And, when the redoubtable Prof. K. S. Krishnan, director of NPL, reeled off his researches with great enthusiasm, Nehru would say, 'That's all very well, but what have you done for the country?' Professor Krishnan was a pure science man but, in order to placate Nehru, NPL came out with a prototype solar cooker as its contribution to relevant technology during 1953-54. After its commercialisation, Prime Minister Nehru and the President of India were presented with complimentary cookers. Nehru's developed trouble and he sent it back to NPL for repairs, never to be returned to him again. The monumental failure of the cooker put paid to NPL's attempts at applied science much to Nehru's disappointment.

In 1958, when a decision had to be taken about who should head CLRI, the failures of NPL and other institutes in coming out with relevant technologies for the country were being openly talked about in the country. CLRI had done some work with the tanners but it was too low profile to attract much attention of the people or the government. Nayudamma was aware of Nehru's frustration with the national laboratories. He noted, 'Nehru's fond hope—that once the infrastructure was built, scientists trained and recruited, equipment, facilities, funds and freedom provided, science would automatically interact with industry and society—did not materialise. Early sixties marked the end of the somewhat romantic phase and questions were being raised about the outputs

from investments in science.'

Besides, Nayudamma was only in his 30s and persons of his age were still engaged in producing research papers. Nehru wondered if Nayudamma had the maturity to handle such onerous responsibility as to head a national research institute. He also wished to make sure that the person he chose had the right commitment to science and its advancement. Most important, did Nayudamma have the inclination to use technology for the benefit of the poor?

Nehru wished to interview Nayudamma personally. The appointment with Nehru was around the midnight. Nayudamma had prepared himself well for the meeting. He knew Nehru's fetish for good personal appearance. Nayudamma turned up for the appointment dressed immaculately in a buttoned up coat, suave and aware of his self worth. Nehru approvingly looked at Nayudamma, who had turned out elegantly. Nayudamma appeared fresh and extremely alert even though it was past midnight. Nehru told Nayudamma that he would be the youngest person to head a national institute and asked point-blank what he proposed to do to develop the age-old leather industry. Nayudamma drew himself up, thanked him and replied, 'I'll endeavour to infuse scientific temper to the tradition-bound leather industry being pursued by the socially and economically down-trodden leather artisans and help in their socio-economic upliftment.' Nayudamma firmly believed in this and so the response sounded sincere, solemn and carried tremendous conviction. Nehru was thoroughly impressed and nodded his head in approval. He knew Nayudamma indeed was the right man for the post.

The rest is history. Under Nayudamma's dynamic leadership, CLRI became the largest and the most credible leather research centre in the world, offering advice, assistance and guidance in matters of leather technology to many countries, especially in Asia, Africa and Latin America. When Nehru visited CLRI in 1958, he was presented with a scented rose made of fine leather, which he marvelled at for its exquisite craftsmanship.



Nehru sat on the bench, watched the presentations made and openly expressed his happiness at how well CLRI had shaped up and the symbiotic relationship between the institute and the industry. When he was informed how the institute helped the lowest castes achieve social and economic equality the glint in his eyes said it all. Nehruji was impressed. Nayudamma had more than justified the faith Nehru reposed in him.



Nayudamma, Nehru, Rajamannar and Kamaraj (1958)

"Would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the Cat.

"I don't much care where," said Alice.

"Then it doesn't matter which way you go," said the Cat.

— Lewis Carroll in Alice in Wonderland

DR PAVANABAI

Nayudamma's official life as head of CLRI blossomed with many achievements and accreditations in India and the Third World countries. His personal life too was one of happiness. His wife Sitadevi was gracious and kind hearted. She was a perfect foil to her husband. Nayudamma was large-hearted. But those who knew Sitadevi say that she was more generous than even Nayudamma. She made few demands on him. Amiable by nature, she would freely mingle with the staff of CLRI, inviting the womenfolk residing in CLRI campus to her home on festive occasions and other religious functions. Their children — two boys and a girl — were playful and their home was filled with joy. This did not last long though. Sitadevi suddenly took ill in 1960. The tests showed that it was not an ordinary illness. The diagnosis was brain tumour. This was a huge blow and Nayudamma was shattered. His home was in total disarray.

Nayudamma felt utterly helpless. His eldest son born in 1953 was only seven years old; his second child, a daughter, six and the youngest child, a boy, just four. There was no one to support him at home. Sitadevi had broken off her relations with her father after he married a third time in his yearning for a son. Even when she was seriously ill, she did not allow her father to visit her. With

a terminally sick wife, three little children to take care of and a job, which was onerous, involving the development of CLRI in its formative years, his cup of woes was rather full.

The struggle on so many fronts proved too much for Nayudamma to cope with. Therefore, he approached Andhra Mahila Sabha Nursing Home requesting them to provide domiciliary medical care to his ailing wife. The hospital deputed Dr Pavanabai, a professional doctor, to attend on Sitadevi.

Dr Pavanabai was from a distinguished family. Her father, Rao Bahadur Venkatappa, was a highly decorated police officer. He received the King's Medal in 1931. He had also served as Madras Police Commissioner. Venkatappa had eight children— three sons and five daughters. His eldest son, Santhosh, was a Judge of the Karnataka High Court in 1970s. His youngest son, Dr Amrith, was a reputed psychoanalyst of Bombay. Pavanabai was the youngest of his children. She was born and brought up in Madras.

As a doctor, Pavanabai volunteered to work for Andhra Mahila Sabha Nursing Home, which she had co-founded with Durgabai Deshmukh in 1953. She was gracious and full of compassion, qualities which endeared her to her colleagues and patients. She was much sought after as a gynaecologist and family doctor, especially by the elite of Madras. She was the personal doctor of Mrs. Janaki, wife of M. G. Ramachandran, Chief Minister of Tamil Nadu, who had herself briefly served as the Chief Minister after MGR's death in mid 1980s. Though Pavanabai was over 30 years of age, she was not married. She had in fact made up her mind to remain single.

Dr Pavanabai's new routine now included daily rounds to

Nayudamma's residence at Gandhinagar to attend on his sick wife.

Nayudamma did not want his eldest son's education to be affected. Therefore, he put him in a boarding school in Hyderabad. The other two children were much too young and so they stayed at home.

Dr Pavanabai visited Nayudamma's home almost everyday to attend on Sitadevi. Nayudamma and Pavanabai naturally grew close to each other. Nayudamma had begun to depend upon her for emotional support. She was his anchor.

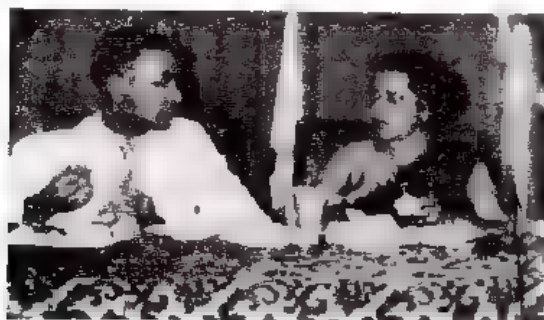
Sitadevi battled with the tumour for three years. She underwent surgery twice but to no effect and she breathed her last in 1963. Sitadevi had firmly told Nayudamma to see that her father did not visit their home even after her death. When her father wished to visit Nayudamma's home after Sitadevi passed away, Nayudamma did not relent. He sent a message that he was not welcome.

At the age of 41, Nayudamma had become a widower with the responsibility of bringing up his three children.

After Sitadevi's death, Dr Pavanabai stopped visiting Nayudamma's home. Soon they both realised that their relationship was much deeper than mere friendship. Their mutual dependence had grown so much that they wished to formalise their relationship with marriage. They had decided not to have any children of their own. This actually was Pavanabai's decision since she did not want to complicate her marriage. Nayudamma spoke to his eldest son about their impending marriage. He also conveyed their decision not to have any children. Ratheish was in

the boarding school. When his father asked if he would mind Pavanabai stepping into the shoes of his mother, he expressed his happiness. Nayudamma and Pavanabai became husband and wife in 1964.

In order to live with Nayudamma, Pavanabai had to change her lifestyle completely. From being an independent single woman, she had to transform into a wife and mother of three children. She made the transition look easy, quickly coming to terms with her new life. She found her new status fulfilling. Pavanabai looked after her stepchildren as her own. It was at her insistence that their daughter, Shanthu, was married to Pavanabai's nephew, Arun Santhosh. Nayudamma was opposed to wasteful expenditure on marriages. His daughter's marriage was performed on 4 September 1978 at Palmgrove Hotel, Madras in a solemn, unostentatious function. Nayudamma's friends from all over the country and many from abroad thronged the marriage hall. It looked as though the foreigners outnumbered the locals. Twenty days earlier, Nayudamma's elder son Ratheish's marriage was performed in Visakhapatnam. That also was a simple function.



Nayudamma and Pavanabai

'Nayudamma was my role model,' said Arun Santhosh. 'I had known him since my childhood. He was a practical person at one level and visionary at another level. He inspired me and people of my generation to dream and excel.' About his aunt, he said, 'She was so compassionate. My wife and her brothers, who were her stepchildren, never felt she was not their biological mother.'

Pavanabai and Nayudamma were inseparable. They were deeply in love with each other. They were generous as hosts and because of their genial temperament and conviviality, they made innumerable friends among tanners, scientists, administrators, theatre personalities, film artistes and academicians from all over the world. Whoever came in contact with Pavanabai were touched by her nobility.

Pavanabai and Nayudamma worked hard. Equally, they knew how to keep work separate from home. Nayudamma in particular would insist that the weekend was for himself, his family and friends. He would ensure that work did not affect his holidays and Sundays, unless there was an emergency.

There was an open house. Almost every night, they would entertain a guest or a friend at home or at the Gymkhana Club. Nayudamma would spend the night unwinding, escaping from the punishing office schedule he had set for himself. After office hours, one saw a completely different Nayudamma — a total extrovert, cracking jokes, pulling punches and full of wit, while Pavanabai played the role of a host to perfection. He was artless. The parties that he hosted regularly cost him a lot of money. As a result, he had hardly any savings.

Subbarama Naidu, an economist in CLRI, had partaken in

some of his evening parties. He recalled how Nayudamma and Pavanabai radiated energy and pepped up everyone with their warmth and friendliness. He recalled Nayudamma's comment in one such party. When he saw a young man riding his motorbike jauntily, Nayudamma gleefully said, 'Pavana wants me to buy a bike and ride on it like that guy. I love to do it with her as my pillion rider; her hands curled around my waist holding me tightly'

Pavanabai accompanied Nayudamma on some of his official visits in India. She joined him on a few overseas trips also, the last being to Vienna in 1984 when Nayudamma went there on UNIDO's work. His children however never went with Nayudamma on his overseas trips



Nayudamma and Pavanabai

Pavanabai was the architect of the Fashion Parade held at CLRI campus in the 1960s. These shows, in which many film stars participated at her instance, contributed to the awareness of the quality of Indian leather goods. She was the vice-president of

Durgabai Deshmukh Hospital and trustee of Andhra Mahila Sabha, Avvai Home and many other philanthropic institutions. After marriage, she became CLRI campus doctor looking after the health of CLRI employees and their families, charging a token fee of just four rupees. The employees of CLRI regarded her as their sister and looked up to her for advice and support even in their personal matters. She was soft spoken, always cheerful and ready to help. She was a friend, philosopher and guide to many.

She was a successful gynaecologist and he a top government employee. Together their earnings were substantial but they did not have any savings. 'They gave good education to their children,' said their son-in-law, Arun Santhosh, as an explanation for absence of much estate. When prodded further, he summed up their life elegantly in a short sentence of three words. 'They lived well.'

Pavanabai was a pillar of strength to Nayudamma. In his letter of 21 June 1967, which resembles a will, he made a special mention of her: 'My life has become richer, fuller and happier after I married Pavana. I owe this lady love of mine more than words can express. His wonderful feelings for her only grew stronger over the next eighteen years.'

Be nice to people on your way up because you'll meet them on your way down.

— Wilson Mizner

SCIENCE FOR THE PEOPLE

Nayudamma was fired by a missionary zeal to transform CLRI into a model research institute. After his appointment as a regular director of CLRI, his confidence in achieving the goal was redoubled and so was his vigour.

The success of the extension workers spurred Nayudamma on with further refinement of the idea in his quest to take CLRI and its research results to more and more tanners. CLRI established extension centres across the country where the extension workers demonstrated modern methods of tanning. CLRI also imported chemicals for tanning for use in the extension centres. These, however, did not succeed in bringing the tanners to the extension centres in droves because they were complacent and content with the traditional methods. They had to be wooed and enticed. This was not easy. Nayudamma now came up with a brilliant scheme known as 'profit yours, loss ours' in which the tanners were asked to bring raw hides, use the machines and chemicals available in the extension centres and check the difference themselves. This was a revolutionary idea, unprecedented in government institutes. When such trials did not involve any risk, as CLRI had underwritten the loss, tanners came forward to try the suggested changes. They quickly realised that there was much sense in what

CLRI said. They not only accepted the technological changes but also yearned for more. In practice, 'profit yours, loss ours' scheme did not involve any loss at all. It was a win-win situation for both CLRI and the leather industry.

Nayudamma began to undertake visits to the tanneries with CLRI scientists accompanying him. These visits served twin purposes. They educated the scientists about the traditional tanning practices. For the tanners, it was a rare occasion of interacting with CLRI scientists and becoming familiar with new technologies. The tanners were made to feel that CLRI was their own, always at their disposal. Nayudamma won the confidence and affection of the tanners before exposing them to modern manufacturing processes, chemicals and machines. A technique, which worked very well, was to send CLRI staff, at no cost to the tanner, to the loss-making concerns and nurse them to health on sound economic and scientific basis. The technique was powerful since it demonstrated that good scientific methods would yield good economic returns.

Another remarkable innovation was 'The Guest Tanner' scheme. Known as Honorary Industrial Associate Scheme, it allowed CLRI to obtain the services of an experienced and enlightened tanner for a period of one year. During this time, CLRI sent one of its staff members to work for the firm of the guest. This enabled CLRI to acquire a realistic picture of the problems of production in the firm. In the meantime, the guest tanner would take a close look at the processes in CLRI and convince himself that a variety of leather auxiliaries, then imported from abroad, could be made in India with the skills and technology available in CLRI. Thus

converted, he would proceed to convince others in the industry with confidence. Scientists from CLRI would have found it quite difficult or impossible to convince the tradition-bound leather industry to modernise. Not so any more when one of their respected leaders conveyed his practical experiences learnt on the shop floor of CLRI. The barriers broken, the industry would now allow the research results of CLRI to be used for production of those auxiliaries from indigenous resources. The tanners began to produce and consume their own auxiliary products. Thus, CLRI not only succeeded in selling its research results without using any of its resources but also earned royalty from the users. When it was launched, many had questioned the wisdom of the scheme. Nobody until now had thought of such a scheme in any government institute. How audacious that an outsider was allowed to get into a government laboratory and be privy to everything that happened in the institute! It was too risky. However, Nayudamma knew that CLRI had nothing to hide, nothing to lose. The scheme was a resounding success. The critics were silenced.

Following the advice of Dr P. S. Lokanathan, Director General of National Council of Applied Economic Research, and realising the importance of economic surveys and studies to support CLRI schemes, Nayudamma established Economics Research Division in CLRI. He was obsessed with the idea of cost effectiveness of research and input/output ratios. With his wide experience, he included pollution costs and other such things in evaluation of research projects. He also took the next step of applying the principles of forecasting to the leather researches. CLRI was the

only national research institute in the country to have a full fledged economics research division. In 1963, there was a furore in the Parliament about the national laboratories not playing an effective role in terms of their contribution to the economy. M. C. Chagla, Minister in Nehru's government, announced in the Parliament that a study would be conducted to assess the contribution of the laboratories. He entrusted the study to Nayudamma. In fact, no laboratory other than CLRI had a pool of trained economists and scientists who had the capacity to undertake the study. Nayudamma quickly organised a techno-economic team of CLRI and carried out the study in selected laboratories.



Nobel Laureate Dr Linus Pauling (Chemistry -1952 & Peace 1962) and Mrs Pauling- Visit to CLRI (1967,

Nayudamma used to come to the office early and leave late. He said, 'I need time to read, think and write.' He would go round the various units in CLRI at 11^o clock every morning, talk to the

workers and scientists and find out the research they carried out. While leaving office late in the evening, if he noticed the lights on in any laboratory, he would not forget to mention it next day in his rounds and appreciate the devotion of the particular researcher. He would make his presence felt, not in the manner of controlling people under him but more as a patron of meaningful work.

Nayudamma believed that for achieving vertical growth of the industry from the stage of semi processing to manufacturing leather products, skilled workforce would be required. Ahead of the industry requirements, one-year diploma courses were conducted to impart training in manufacture of leather products to the boys and girls with 10th standard qualification. There was no course fee. UN experts were invited to conduct the classes since there were no trainers in the country. For practical demonstration, machines were imported. Because of this training, when the leather industry set up production units, it had ready supply of trained personnel to run them. In course of time, many of them became production managers and some started their own manufacturing units.

In 1963, Nayudamma asked Sankaran, Editor of The Indian Leather, to associate with Dr K. T. Sarkar of CLRI to organise a Leather Fair. Following this, The Indian Leather Fair Society was registered. The first Leather Week in 1964 was inaugurated by R. Venkataraman, Tamil Nadu Industries Minister. The first Leather Fair was declared open by Manubhai Shah, Central Minister for International Trade. M. L. Vasanthakumari, the doyen of Carnatic music, sang the invocation song. Thereafter, the Leather Week and Leather Fair became the annual features from 31 January to 6

February. In 1966, the Leather Fair included Leather Fashion Parade conducted by Dr Pavanabai Nayudamma, which witnessed record attendance of more than 5000 people. Indian leather goods began to receive worldwide attention when the buyers of leather goods from all over the world converged on Madras to participate in the Fair. The Leather Fair became an important event in the Madras calendar.



Nayudamma with honorees from the rural sector (TGT 1966)

Nayudamma saw to it that CLRI established effective liaison with the leather industry. He was instrumental in the creation of the Indian Hides and Skins Improvement Society, the Leather Club, and the Coromandel Chemicals, the last being an exclusive organisation of tanners for exploitation of CLRI research results.

Nayudamma believed that the scientific achievements in Russia were due to the comprehensive information system built by that country. After being convinced that the Russian model could be put to use in CLRI, he went all out to promote a sound information base in CLRI. The information system introduced in 1968 served not only the needs of CLRI but also the leather industry of the

Third World by forging strong links with a number of countries. He built an extensive grid of liaising with the neighbouring institutes and other institutes of the CSIR with a view to fostering co-operative spirit among his researchers as well as allowing them a window to know the current developments in other fields. The leather industry all over the world and especially the Third World countries became aware that a practical visionary was leading CLRI.

Though leather technology and the efficient use of animal by products remained Nayudamma's dominant interest, the UN agencies and more than 50 developing countries sought his advice over a wide range of issues relating to science and technology policy and industrial and human resources development. A United Nations agency made special reference to his statesman-like advice on conceptual and innovative approaches to technology policy and development.

He knew that some of the foreign trainees and students at CLRI would in course of time become the leaders of the leather industry in their countries and the world bodies and so he asked CLRI scientists and teachers to bestow special attention on them and treat them as honoured guests. As predicted by him, these foreign trainees would soon be very important persons, occupying high positions in the government and the industries in their countries as also representing their government in the United Nations bodies. The scientists from CLRI would often bump into these alumni in the international conferences or other meetings. The alumni would turn nostalgic, and warmly say, 'Oh! You're from Nayudamma's Institute!' Nayudamma's actions in CLRI

generated tremendous goodwill among the overseas students and that kept the CLRI flag flying high in every international forum.

As / Dr. C. S. Chelva (C. S. Chelva).
 2 report. It was in
 a point for the western nations
 - 2 weeks in advance - about
 any foreign trainee / scientific
 etc. leaving us. Every time
 it comes to me as a surprise
 at the last day.
 He made receive such
 and was on foreign visitors
 as honoured guests. Simple
 contents go a long way to build
 friendships and ambassadorship
 to your host country.
 A 3/3

The administrative policies of CLRI were transparent and well defined. Nayudamma was open to criticism, constructive or otherwise, from within and outside CLRI. He allowed his actions to be dissected and debated. If he received any letter from anyone criticising him for what he had done or not done, he would have it pinned up on the notice board for everyone to read. His life was an open book. If he made mistakes, they were *bona fide* and never for personal gain or to favour someone dear to him. Each of his

decisions passed the touchstone of merit. He was an exemplar, scrupulously following the path of rectitude and probity. It is to the credit of Nayudamma that as director of CLRI he prepared a 5-page appraisal form, covering all aspects of his performance, and gave it to the scientists and staff. He asked them to fill the form and, since he wanted their free and frank opinion, he asked them not to sign the form. In the 1960s, when management was driven by command and control, this kind of assessment of the boss was unthinkable and in fact audacious. But here was a man who was keen on knowing where he went wrong and the areas where he had to concentrate for improvement. Directors of other national laboratories, of course, thought Nayudamma had gone crazy. Some criticised him for spoiling the scientific community with his innovations in administration. But his unqualified success in CLRI and the pre-eminent status that the institute earned for itself not only in India but elsewhere in the world proved his detractors wrong.



Nayudamma with Prince Philip at CLRI

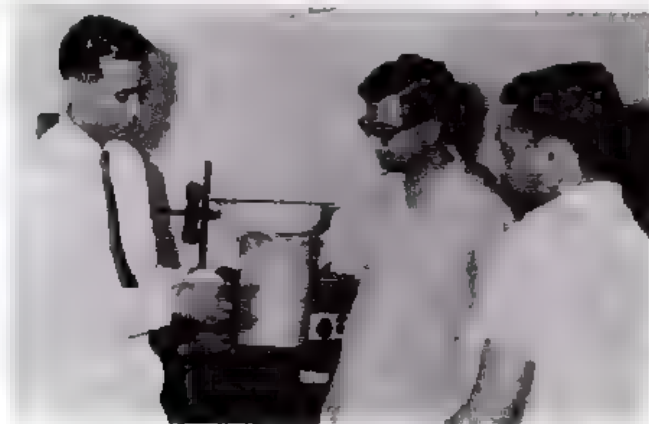
Nayudamma was conscious of the pitfalls of complacency. He conceived definite plans for the industry's future, some of which had the potential to ruffle the industry's feathers. He knew that export of raw leather did not sub-serve the country's interest. He wanted value-added products to be exported. He was aware that the leather exporters would be unhappy if he opposed export of raw leather. Not wishing to be the target of their ire, he shrewdly used the Commerce Ministry to adopt and own his suggestions. When K. B. Lal, then Union Commerce Secretary, sounded him to suggest steps for increasing leather exports, he sent a confidential report in which he listed out the measures which would enable realisation of the export potential of leather industry. He suggested phasing out of export of semi-tanned leather. His prescription was to impose quantitative restrictions and levy duty on export of semi-tanned leather. He also suggested imposition of a ban on export of raw hides. Simultaneously, he urged liberal credit supply to the industry for setting up manufacturing units for finished leather and leather products. He recommended air freight subsidy and cash incentives for export of finished leather and leather products. He justified these measures in order to secure 5-fold increase in export earnings over a period of five to six years. These suggestions were incorporated in the Seetharamaiah Committee Report of 1973. The government implemented his suggestions over the next few years and they paved the way for modernisation of leather industry in India. The export potential that he had visualised was also realised in due course.

He was quite aware of the earning potential of leather products and had a cell for leather goods set up in CLRI as early as 1960

Later on, it became a major wing of CLRI. Unfortunately, in spite of his best efforts, a footwear wing could not be set up in CLRI. He regretted his failure in this area.

Being well aware of the importance of public relations, Nayudamma in particular saw to it that the visitors to CLRI—high or low, big or small—were treated with courtesy. He stressed that it was the duty of the staff to see that the visitors went away from the institute carrying positive impressions. The scientists in the other research institutes at his level were prone to focus only on research but not Nayudamma. He always showed keen interest in building bridges for the institute with the rest of the world.

In the public meetings held in CLRI, Nayudamma always sat in the last row, quietly jotting down notes on the issues raised by the speakers. He went up to the podium only when he was called upon to speak. He maintained that the scientists of CLRI had to be in the forefront, conduct the meetings and take responsibility for not only their research but also the image of CLRI.



With Dr Raja Ramanna of BARC (1969)

Nayudamma encouraged participatory management in the institute. He ensured that each researcher knew exactly what he was doing, what he expected out of it, and its relevance to the country. He also allowed the research staff to question boldly the actions of the director, which was unthinkable in the past. He said, '15 years ago, nobody would open his mouth at a seminar if a director or a deputy director presented a paper for discussion. He was afraid to criticise but today he might shred the paper to pieces...'. No wonder research in CLRI was result-oriented.



*Nayudamma with Dr Vikram Sarabhai,
Chairman, Atomic Energy Commission*

The research carried on in CLRI was so closely aligned with the industry's needs that the interaction between CLRI and the leather industry became a model for many CSIR laboratories. Dr M. S. Swaminathan, architect of India's Green Revolution, said, 'He (Nayudamma) was one of the unusual scientists who had no

inhibitions in learning from illiterate artisans. Thus, in his own field of leather technology, he took a course intended for cobblers. This is because he felt that unless he knew his clients well, he would not be able to serve them. No wonder that when the Sarkar Committee on CSIR, of which I was a member, examined the work of different institutions from the point of view of the size of the gap between laboratory knowledge and its field application, CLRI at Madras, of which Dr Nayudamma was the then Director, was found to be practically the only one where there was hardly any such gap. This high degree of utilization of technology originating from CLRI was largely because of the great emphasis placed on maintaining a continuous feedback relationship between those working in the leather industry and the scientists of the Institute and subjecting their data to economic viability tests.'

Dr T. Ramasami, former Secretary, Dept. of Science & Technology said, 'A seed for science with conscience sown by Dr Y. Nayudamma is the tree grown in the form of current day CLRI.'

Under Nayudamma's leadership, CLRI truly became a beacon of applied technology and a true friend of the leather industry.

An institution is the lengthened shadow of one man

— R W Emerson

'OUR NAYUDAMMA, OUR CLRI'

Nayudamma was convinced that the director's role in CLRI was multi-dimensional. 'The director is not only a director of research but even a director of management, public relations officer, salesman and an image builder,' he said. 'He should also be an entrepreneur, a change agent, sensitive to the needs of the people, flexible and resilient in responding to rapid changes with leadership qualities, committed to service, energetic in getting things done and sensitive to inter personal relations.' What about external environment? 'The job of the director is to understand the needs of the industry and the society on one hand and the plans of the management on the other, then he has to correlate these, devise a technical policy, balance research programmes and create an atmosphere to stimulate imaginative and dynamic research work.' He lived up to these ideals. Besides, he boldly grafted the social agenda of breaking caste barriers imperceptibly into the working of CLRI. His success as director of CLRI, the social changes that ensued and the transformation of CLRI as a premier institute were not due to any divine dispensation. Nayudamma did all the above quietly, conscientiously and diligently, like a sculptor painstakingly producing a masterpiece.



Visits to the tanneries constituted an important part of Nayudamma's agenda. When he visited a tannery, the tanner would garland him and the scientists who accompanied him, ask for photographs, and serve tea and biscuits. This would consume quite a lot of time. Nayudamma thought this was a sheer waste of precious time and insisted on cutting out all this. When he realised that this was not acceptable to the tanners, in the later visits, he adopted a different strategy. The moment he reached a tannery, he would ask for garlands, tea and biscuits, and group photograph. He would finish all these in a matter of a few minutes and get down to the actual business.

Nayudamma involved himself not only in the activities of the leather industry but also in the social life of the tanners. They, in course of time, treated him as one of their close friends and well-wishers. He never missed a function in the tanners' homes to which he was invited.

The tanners always felt they could walk into CLRI, take the scientists to their tanneries and ask them to solve their problems. When a tanner wanted his help, the CLRI scientist would leave the

work at hand and rush to the tannery. This was the culture that prevailed in the institute. In fact, the common refrain those days was that Nayudamma was not aware whether a scientist of CLRI was in the laboratory or was working on some problem in a tannery. He encouraged the scientists to establish a close rapport with the industry, which ultimately helped CLRI to garner an image of a friend and guide of the industry. Nayudamma toured the length and breadth of the country and shared pot luck with the lowest among the cottage tanners. His sincerity, informality, personal approach and consideration to men and matters made tanners accept Nayudamma as 'Our Nayudamma' and CLRI as 'Our CLRI'.

Nayudamma's term as director of CLRI was hectic—visiting tanneries, encouraging scientists to come out with relevant technologies, introducing innovations, advising the government and cultivating the industry. Leather industry all over the world, the Third World governments and the UN agencies recognised him as a visionary leader and looked up to him for advice and guidance. So, his schedule now included frequent travel abroad. Yet, Nayudamma always found time for academic activities. As a teacher, he was much ahead of his times and introduced many innovative methods in teaching and learning techniques. He discouraged learning by rote.

A large number of his students and researchers for whom he was the guide eventually became managers of the leather industries not only in India but also in more than 30 developing countries. They were from all castes and classes. He thought aggressively and spoke softly. He believed that the best and assured means to

bring about technology revolutions in a tradition bound industry was to engage CLRI in human capacity building. The relationship with the University of Madras in conducting courses in leather technology was phenomenal. Today the vibrant relationship within the trinity of academy-research-industry for the leather sector is exemplary. People like me emerged from such a partnership and nearly 60% of the industry in India is manned by the alumni of the university-research partnership,' said E. Ramasami, his student and protégé, who in June 2014 retired as Secretary, Department of Science & Technology.

Nayudamma's efforts to modernise the leather industry and in particular the rural tanneries were monumental. His empathy for the workers in rural tanneries who mostly belonged to the underprivileged and disadvantaged sections of the society was genuine. It was due to his untiring efforts that the tanning industry was accorded dignity and an honourable place in the hierarchy of industries. Tanning ceased to be a reprehensible profession which it was for centuries. He was immensely proud of his profession. He often said that he was an untouchable by profession and proud to be one. While addressing a symposium in the US, in June 1978, Nayudamma recalled the observation of an outstanding scientist of India at the time of inauguration of CLRI: 'Who wants this untouchable institute here? What we need is an institute of biology or biochemistry.' Nayudamma said there was no room for such questions now. 'High caste people have moved into leather business in great number. They realise that leather is not that untouchable after all,' he said. He also recalled that the same scientist who had earlier derided the institute as untouchable

visited CLRI many years later and expressed his great surprise on seeing how 17 branches of science including biology and biochemistry interacted in making leather and how clean the operations were. Though Nayudamma did not name the scientist in the symposium, the Indian scientists had no difficulty in recognising that he was referring to the Nobel Laureate Sir C. V. Raman.

Nayudamma was not content with simply seeking to transfer research results to the leather industry. In the mould of a true social scientist, he wanted the society to recognise that the tannery and the leather industry were like any other industry. He put into practice many path breaking initiatives to this end. One such initiative involving children had tremendous impact. CLRI would invite children from various schools, and make them understand the processes in the leather industry. The visit would start with the handling of raw hides and skins that emitted foul smell. The children were then taken through the other operations. The visit would end with watching the making of the finished leather which was ready for manufacture of leather goods and footwear. Afterwards, the children would participate in an essay or a drawing competition on leather or stage a play focussing on the use of leather materials. In these activities, the tanner and cobbler caste children would mingle with the children of other castes without any discrimination. This struck at the very root of the caste system. The children also would realise that tanning was not at all abominable, thus helping some children decide upon a career in leather industry, eventually fulfilling Nayudamma's desire of drawing people of all castes to the leather industry. In course of

time, tanning became the occupation of the so-called upper castes also. Thus, a social revolution had been successfully engineered.



'Nayudamma was one of the prominent scientists who with vision applied science and technology for the development of the industry and finding solutions to the varied problems which hindered development. Coming from a rural family he chose the leather industry as his first choice to upgrade the industry which was understood as the profession of untouchables into what I would call the Brahmin industry,' said Bharat Ratna C. Subramaniam, who had seen Nayudamma's work from close quarters.

In 1971, Nayudamma was conferred Padma Sri for his services to the nation.

The only place success comes before work is in the dictionary

Vince Lombardi

WHAT NEXT?

Nayudamma completed a decade as the director of CLRI by 1967. Yet he was all of 45 years, his spectacular successes belying his age. During this decade, CLRI achieved the distinction of being the largest leather research institute in the world. Nayudamma received recognition as a leader of rare merit and practical scientist of unparalleled vision. He was a positive influence on many young scientists. He had achieved whatever he had dreamed of.

Nayudamma did not become egotistic even after tasting such successes and in spite of being at the top for so many years. Still open to criticism, he remained quite sane, practical and humble.

While his successes in CLRI were many, a charge against Nayudamma, which appears valid in hindsight, was that he opposed import of technology needlessly. 'Foreign technology is more suited to conditions in the countries where it is first developed, not necessarily to the resources and skills of other peoples. If technology is readily available or likely to be available in a reasonable time through indigenous research and development, import of know how should be discouraged,' he said. Nayudamma's argument in principle may be valid but his doctrinaire approach to the issue appears to have not helped the country's interests. Leather industry watchers contend that Nayudamma and CLRI served the industry's needs well until a

point of time after which the industry marched ahead while CLRI's technology lagged behind. Nayudamma himself tacitly admitted this while addressing the 25th Tanners' Get Together at CLRI on 1 February 1984 as a guest. He said, 'If CLRI has to serve the industry well, it should be 5-10 years ahead, to develop newer tools, techniques and trend thought. Both research and training of men require lead time.'

A period of 10 years in the same job at the same level could be long, long enough to be bored. Monotony could set in. New ideas could stop from seeding. Did Nayudamma feel stale? He had been the director of CLRI without a break since 1957. His years of research long since over and the agenda he had set for himself in CLRI accomplished in ample measure, he might have. He probably remained stationary while the leather industry marched ahead. It would have required a super human effort for him to keep fresh and interested in the job. His letter of 21 June 1967 probably captures something of his situation in 1967.

The letter reads like a will. What impelled him to write it at such young age? In India, the tradition is not to write a will and, if ever written, it is invariably at the fag end of one's life. It cannot be that his first wife Sitadevi's early death prompted him to write it. That happened a long time ago and his life with his second wife was full of happiness. His health was perfect. Above all, he had no estate to bequeath. Why a will, then? Lack of justification for writing a will perhaps proves the point that it was not a will after all. Yet how could anyone deny its striking resemblance to a will?

The letter says he 'lived a full life'. Strange for one who was just 45 years old and in good health to say this. Probably his sense of

I have no regrets. I lived a full life.
Loved, loved, enjoyed - earned have
contributed to the country, community
and the world if only to a small extent.
My life has been simple, plain,
frugal, and I am a Pavanabai
man. I am a man of many more
words can express my feelings - another
I am so deeply grateful and for the different
from of the world makes my own.
I am not really in the
world. My heart and my hands are all
for the world. India, women, children
of all ages, old, young, poor, rich, and
every one who is in the world.
I am a man of many more words
can express my feelings - another
I am so deeply grateful and for the different
from of the world makes my own.
Nayudamma
June 21, 1967

fulfilment made him feel that he had reached the pinnacle of his life. He says he 'loved' his life. On personal front, Pavanabai lighted up his life and it could not have been better on professional front. He says he 'enjoyed' life. He was successful and that brought him joy. He claims he 'worked hard'. None could doubt this.

The letter says that he 'contributed to the country, community and the world if only to a small extent'. This does not seem to be a casual statement. It appears as though he was not looking forward much to the years ahead of him. Was this suggestive of his stagnation in CLRI? Or that the world marched forward while CLRI remained stagnant? Perhaps, both.

His letter seems to allow one to enter his mind but not divine his thoughts or what he intended to convey. If the letter is an enigma, so be it.

I am a small man who wants to do big things for small people.

— Narendra Modi

DIRECTOR GENERAL WITH A DIFFERENCE

Dr Husain Zaheer, director of RRL, and Dr Nayudamma, director of CLRI, were close friends notwithstanding the difference in their age. They were allies, questioning the relevance of some policies and procedures of CSIR. Their association based on mutual respect ripened into a close friendship which lasted until Zaheer passed away in 1976. Zaheer admired Nayudamma's administrative capabilities and in particular his ability to carry people of all shades of opinion with him. When Professor Thacker was to retire as DGSIR, Husain Zaheer, who then was director of RRL, Hyderabad, was informally sounded as to who should succeed Thacker. He immediately mentioned the name of Nayudamma. CSIR then had nearly 40 national laboratories under its umbrella, directors of which were much older than Nayudamma. What seems to have gone against Nayudamma's selection for the post was his age. In the event, Jawaharlal Nehru chose Dr Husain Zaheer for the position. Dr Husain Zaheer served as DGSIR from 1962 to 1966 but, on more than one occasion, Zaheer mentioned that Nayudamma would have been the best DG ever. Zaheer was succeeded by Atma Ram who served from 1966 to 1971. Zaheer was happiest when Nayudamma was offered the post of DGSIR in 1971.



Nayudamma with Husain Zaheer (1965)

CSIR had enjoyed the status as the premier apex scientific body of the country, a reputation sadly besmirched in the late sixties. During Atma Ram's term as DG from 1966 to August 1971, questions about CSIR's utility and the role of DGSIR were being raised at many levels. CSIR's credibility suffered enormously. Internally too, it was beset with crises. There was a loss of confidence between the DGSIR and the directors of the national laboratories leading to demoralisation of the latter. There were problems at another level too. Atma Ram's view was that science could not be planned and the development of science should be best left to eminent scientists. This was at variance with the earlier thinking. The scientists were confused. Atma Ram also debunked the role of pilot plant research. Issues were personalised. Conflict and tension in CSIR were palpable. The situation was highly charged. The fortunes of CSIR touched a new low.

The Sarkar Commission of Enquiry, which went into the problems of CSIR, made many recommendations for the reorganisation of CSIR. The government had accepted the

recommendations. With Atma Ram's retirement in August 1971, CSIR, required a scientist administrator who could restore the credibility of the organisation. Nayudamma who fit the bill perfectly was once again the fortune's favourite at a young age.

When Indira Gandhi offered him the position of DGSIR, Nayudamma knew it was an honour but he was aware that the job involved a lot of administrative work. The job would require him to deal with the bureaucracy, disparate scientists, and disgruntled directors of national laboratories, some of whom had tendered resignation citing ideological differences. He noted: 'The scientific scene presented an arena of intense controversy, appointment of committees over committees, questioning, introspection, discussions – sometimes acrimonious – inside and outside, the press, the Parliament and in scientific forums on the strategy, organization and planning of scientific and industrial R & D.' Nayudamma was justifiably hesitant. He had another reason for his reluctance. He would have to go to Delhi and his wife Pavanabai might not join him owing to her professional commitments as a medical doctor in Madras.

He was ready to spurn the highest administrative post a scientist in India could aspire for. But Nayudamma's well meaning friends, many of them colleague scientists and directors of the national institutes, stepped in and cajoled him, and, when that did not yield the desired result, begged him to accept the offer. When Pavanabai also joined them, assuring him that she would go to Delhi and live there, he agreed. His acceptance of the offer was subject to two conditions. One, he would serve only for five years and not more. Second, he should be allowed to go abroad for

about three weeks every year to fulfil his commitments with various world bodies.

Indira Gandhi was annoyed. She was not used to such responses. She was imperious. 'Who is he to impose conditions?' she asked C. Subramaniam, her Minister for Science & Technology. He told her that if she wanted Nayudamma's services, she would have to agree to his conditions. C. Subramaniam had asked for him. She understood and acquiesced.

When he assumed charge as DGSIR on 27 August 1971, he was 48 years of age – the youngest ever to occupy the post. He lived at 1, Teenmurti Lane, New Delhi, a few bungalows away from Indira Gandhi's. His wife and his children, Ramesh and Shanti, lived with him. His eldest son was lodged in a boarding school.

Nayudamma's responsibility was to deescalate strife and defuse tension in CSIR, establish rapport between the DGSIR and the directors, improve the morale of the scientists and restore normalcy in CSIR. Nayudamma functioned best in a climate of peace, orderliness and friendship and he set himself the task of creating such atmosphere. He ruled out any action which might smack of vindictiveness, hostility or animosity towards those who might have wronged him, his other colleagues or CSIR. Reconciliation was his credo.

He maintained excellent relations with career bureaucrats because he knew that without their support a technocrat would be 'always on tap but never on top'. Nayudamma was lucky to have the support of C. Subramaniam, minister in-charge of CSIR, and the backing of Prime Minister Indira Gandhi. In co-operation with the Prime Minister's Office, he set about undoing the damage

done in individual cases. He issued a clear directive against arbitrariness. He said things must be done in accordance with the rules and procedures and if a rule was considered obstructive it should be amended or the appropriate authority had to be consulted to overrule it. He modified the rules of recruitment paving way for objective selection of scientists for higher positions. And he ensured that only scientists and technologists were involved in the selection of senior scientists and directors. The decision making in CSIR for a long time had been centralised at CSIR headquarters. He changed this, allowing maximum functional and financial autonomy to the national laboratories.

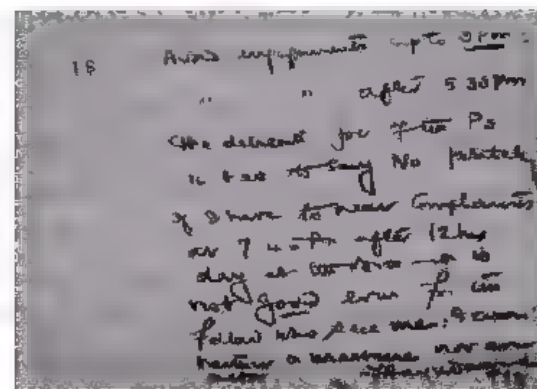


*Indira Gandhi, Nayudamma,
C. Subramaniam & Nurul Hasan*

His tenure was marked by cordiality, grace and goodwill. He remembered the birthdays of his colleague directors and sent them greetings unflinching. He made the position of DG humane

and his office a haven for people who visited him and shared their problems. Perhaps, the secret of his success was his accessibility. A young Punjabi refugee entrepreneur said Nayudamma was the greatest research director in India. The basis for his judgment was rather simple. He could meet Nayudamma ten minutes after seeking an appointment whereas he could not meet some of the directors of the national laboratories even after months of waiting. He was also excited that Nayudamma had promised to visit his small unit in old Delhi.

As DGSIR, he gave clear and elaborate written instructions to his personal secretaries about the manner in which he expected them to manage his office, such as fixing appointments, treatment of visitors, punctuality and so on. At the end of 19 ground rules, which exemplified his work ethics, he wrote, 'The essence of it all is whatever we do let us be human and let us express our good grace, culture and courtesy.' He had to set the ground rules in clear terms for he knew that in the government an officer was as good as his personal secretary. He made or mended the image of the boss.



Nayudamma brought about structural changes in the Councils functioning by implementing the major recommendations of the Sarkar Commission. In administration, he was highly innovative. He took steps to delegate and grant greater autonomy to the national laboratories and make the central office function more as a technical headquarters than an administrative one in order to make it result-oriented. He began by reorganising the headquarters into different divisions. The head of each division, designated as 'Chief', had the responsibility for planning. That this arrangement more or less continues to this day in CSIR is testimony to the efficacy of the system introduced by him.

He changed the character of the governing body by internalising decision-making. He also introduced major changes in the research advisory committees and the executive councils of the laboratories. He asked the directors of the laboratories to undertake applied work, take up consultancies from the industry and to see that the results of research were applied. He said that the laboratories must earn at least 50% of their expenditure in due course. Many were left wondering at this. The role of CSIR and its laboratories was to generate new technologies, anticipate problems and provide solutions rather than get involved in the immediate problems, they thought. Nayudamma accepted the validity of this view in part but he still veered towards technology for the people as a national priority.

Being a firm believer in technology for the people, he deprecated the tendency of some scientists who said they only knew science and it was up to the industry or the government to make good or bad use of the scientific results they produced. 'This is an

escape route designed by clever scientists. If scientists wish to remain in their monastic environment, they should not complain that their bright ideas are not blooming. They should actively interact with the social system,' he said. He believed that the national laboratories would do well to concentrate on subjects that have an applied or industrial bias leaving the other problems to the scientists in the universities and other research institutes.

Nayudamma's personal preference for applied research as opposed to basic research was well known. But he did not allow this to have a bearing on the official decisions and more so in the matter of appointments. He realised that as the head of CSIR, he had to maintain a delicate and harmonious balance between the two divergent views. His approach was evident when he had to select the head of a national laboratory. The selection committee had shortlisted two people— one a scientist and the other a technologist. Whom would Nayudamma choose? The scientists watched him with curiosity to find signs of obvious bias in his personality. He chose the pure science man even though he personally preferred the technologist. He did not want people to accuse him of bias.

Rural development was close to his heart. As a leather technologist, he had toured the rural areas of every part of the country and had seen the kind of changes that the application of science and technology had ushered in the lives of the poor. His faith in the wisdom of the villager is worth repetition: 'If he can be shown the benefit of an improved method, he would accept the technology. He has no resistance to change.' It was this faith that gave birth to the Karimnagar Project. In conceptualising this

project, Nayudamma was a visionary and far ahead of his time. The project and what came of it are dealt with in the next chapter in some detail.

In the teeth of determined opposition from some ministries, Nayudamma got through the Scientist Entrepreneur Scheme whereby a scientist could take leave up to three years to start an industry based on CSIR laboratory developed technology and, in the event of failure, return to his job. The story of a scientist who turned an entrepreneur with Nayudamma's support is narrated in another chapter.

During Nayudamma's tenure, CSIR announced a scheme called 'Package Deal'. This sought to attract Indian scientists and technologists, having the requisite skills, to return to India to set up industries in India. In real terms, this was the reverse of the brain drain. The package comprised assistance in industrial licences, capital goods licences, import licences, access to industrial infrastructure, water, power, etc., financing from banks and financial institutions. The package allowed them to retain foreign earnings for import of machinery and spare parts for the industry. Some technocrats who had made good in the U.S. took advantage of the scheme and returned to India to start industries in the country.

Alongside the Package Deal, attempts were afoot to attract promising Indian scientists to return to the country. Nayudamma was sent to the U.K. by Prime Minister Indira Gandhi in 1974 with a specific mission of spotting the brightest and the best scientists abroad and lure them to return to the country by offering jobs to them on the spot. Mashelkar was one such bright scientist. He

got a telex message from Dr Tilak of NCL, 'Go and meet Dr Nayudamma.' He did not tell the reason. Mashelkar had already made a name for himself and had offers from three U.S. universities as well as the Imperial College. He was about to take a career decision. Nayudamma talked to him about emerging India, the challenges and how a new India could be built only by talented young people like him. Mashelkar then was 31 years of age. He was inspired. He accepted Nayudamma's offer and joined NCL. This was a turning point in his life. Mashelkar rose to the position of director, NCL and later on DGSIR. He was conferred Padma Vibhushan in 2014.



*Nayudamma, Indira Gandhi
& Santhappa*

The idea of establishing Poly-Technology Clinics too was Nayudamma's brainchild. The clinics were to bring the scientist

and the research institutes closer to the problems in the field, provide diagnostic service to the small scale entrepreneurs to identify the problems and to provide technological solutions.

He proposed that CSIR and ICAR should establish a joint scientific panel in order to maximise the complementarity strengths and expertise of the two organisations. This interaction proved most beneficial in areas such as oceanography, jute and cotton technology and oilseed technology.

Nayudamma's decision-making in CSIR was one of great circumspection. He sent back every proposal with a lot of questions. The file would come back with further notes. He would add a few more questions. He would also circulate the proposals. This consumed time but he was keen to have different views and weigh the pros and cons before taking decisions. He shunned controversies. This attitude must have been a consequence of the circumstances under which he was appointed as DG. Many thought his style of functioning was a little too cautious, too slow and obsessively consensus-oriented. He would not command. He would prefer a quiet march.

He was aware of the criticism that the impact of CSIR on the national economy was marginal. But he felt that the criticism overlooked the handicaps of CSIR. He said other agencies could import technology without any restrictions whereas the national laboratories could not. CSIR had no resources for scaling up the laboratory results. There was no risk capital for the industry to use indigenous technology. The industry had no incentives for using the local technology. Nayudamma studied the situation in depth and thought of bolstering the image of CSIR despite the

handicaps. With this in view, he worked hard and managed to have a high level committee set up by the government with the vice-president of CSIR, the Finance Minister and the Education Minister as members to approve a mechanism which would help the use of results of researches and promote technological self-reliance. This high level committee would have given massive fillip to the national laboratories. Unfortunately, there was change in the political leadership, with the mantle passing over to Morarji Desai. Soon, Nayudamma tendered his resignation even though the new Prime Minister asked him to continue. The efforts of Nayudamma to boost CSIR's contribution to the nation's economy proved infructuous.

'Few would shun power and authority as he did,' reminisced H. A. B. Parpia, former Director of CFTRI, Mysore. 'His width of understanding and depth of knowledge of human society, science and technology were most needed at the time he took over as the DG, as CSIR had gone through a very difficult period of five years preceding his term of office. Nayudamma restored confidence, stimulated scientific work and provided human dignity to the scientific community.' When he quit as DGSIR, he told the scientists that he had done what he could, but now CSIR was theirs to maintain and develop further. When he laid down office as DGSIR in July 1977, the heritage he left behind made his successors and colleagues feel proud.

Nayudamma was admired by friends and foes alike. Not that he had any foes. He had disagreements on principle with some people but, at a personal level, he was an *ajatasatru*. A scientist of international repute, who worked as director of a CSIR laboratory

and who had quite a few disagreements with Nayudamma, openly acknowledged that he was the best DGSIR and admired him for his scientific perception, uncommon vision, and abiding humanism



Addressing the directors of the national laboratories in 1973, Prime Minister Indira Gandhi said, "There is no doubt up to now we have viewed science and technology just as one compartment. Now it has dawned on us that science and technology is not a compartment by itself but rather a very vital input to all other compartments and we cannot have growth in the country without this realisation." This strident call to the scientists was reminiscent of Nehru's question in 1951 addressed to K. S. Krishnan, who was waxing eloquent about his researches in pure physics. "What have you done for the country?" Things had not changed much even after more than 20 years. Taking cue from the Prime Minister's call, Nayudamma urged the scientists in 1974: "The country today is in a crisis in which everybody has to give up something. Let us, in all fairness, give up our unyielding, non profitable, individual oriented researches and concentrate on a few nationally relevant

technological tasks as multi disciplined, multi-organisational projects, which are time targeted ...' This had no effect. The scientific community did not respond, did not yield. Nayudamma had the backing of the Prime Minister and the Minister of Science & Technology, and yet it must be said that his success in securing the support of the scientists for the national economy was limited.

Perhaps Nayudamma was too gentle. He made a virtue of seeking reconciliation when a little confrontation was necessary. He probably was guilty of not knowing the maxim of statecraft that those who spurn the hand of reconciliation must be made to realise the cost of confrontation. A little more decisiveness would have certainly served him and the country better. Nayudamma was acclaimed as the best DGSIR but this hardly pleased him. He would have felt gratified, on the contrary, had some institutes paid heed to the Prime Minister's call and served the industry and the poor of the country during his tenure at CSIR.

If people knew how hard I worked to get my mastery, it wouldn't seem so wonderful at all.

— Michelangelo

KARIMNAGAR EXPERIMENT

Nayudamma believed that non linear growth could be achieved through technology. He had seen this happening in the developed countries. He genuinely felt the need to take technology to the village level in order to improve the living conditions of the people of rural India. In CLRI, he had aimed at the betterment of Harijans by developing technologies that would improve the working environment and their economic condition. He had succeeded in his mission. When he moved to CSIR, the desire to uplift the poor prompted him to develop his ideas on a broader canvass. He gave expression to his ideas on the subject for the first time in the spring of 1972 in his Zakir Husain Memorial Lecture.

These ideas fructified into what came to be known as the Karimnagar Project. The scheme was a mixture of a few major trends in thinking: the Gandhian approach, the Chinese ideas of walking on two legs – the Chinese way of balancing pure science and applied technology – and the Russian ideas of Science City. The experiment involved adoption of a backward district for changing the face of under-developed areas by the use of science and technology. Nayudamma brought together eight national laboratories under CSIR dealing with such diverse disciplines as physics, chemistry, geology, water, instrumentation, structural

engineering and regional development. The project was to be extended later to all the districts in every State. The project envisaged involvement of the scientists in overall improvement in the standard of living of the farmers by helping them with soil testing, irrigation, repairs and updation of implements and nutrition of their family members. In fact, at Nayudamma's initiative, the national laboratories had discussions with twenty States on their Fifth Five Year Plan and identified the regional centres, extension units, and poly-technology clinics that would put science and the scientists in the forefront in the battle against poverty. 'The show-how of the know-how developed through science and technology is important. Seeing is believing. It must be communicated in the language understood by the villager,' Nayudamma said. Karimnagar in Andhra Pradesh was the first district to be adopted and RRL, Hyderabad was named as the co-ordinating laboratory. The district, classified as backward, was identified in consultation with the State government. The project was launched in September 1972. CSIR set up an office at Karimnagar for Liaison and coordination.

Nayudamma's approach was to invite the technologists and engineers to provide a model which the villagers were expected to replicate. He insisted upon the presence of the district administration in the project. The reason for involving the administration was to make the scientists recognise the fact that the district administration was there and would be there, had the responsibility and was involved in the process of change. This integrated rural development project in Karimnagar District brought to fore the full impact of his vision. He wished to

demonstrate how advanced technology such as the satellite imaging could be blended with the simplest of rural needs. He was truly a pioneer in the meaningful integration of the traditional and frontier areas of technology. Dr Thyagarajan, former director of CLRI said, 'He was one among the few who recognised the importance of linking science and technology with the national economy .. Karimnagar project was remarkable, a pioneering initiative, which brought the World Bank president and other leaders to Karimnagar .. He showed the way.'

Indeed he showed the way. And with Nayudamma's commitment and the involvement of the district administration, the project ought to have succeeded. But, unfortunately, the scientists involved in constructing the model had not been exposed to socio-economic factors of rural India. The project also did not involve the people in evolving the models, which they were expected to use. There were some who felt that the scheme was faulty in conception, that the problem of rural India was not merely of technological backwardness but also one of socio-economic factors and those required to be studied and factored into the project. For the scientists, this was the first exposure to this kind of work. Besides, the transfer of technological results directly to the rural scene was highly complex. Therefore, the scientists were not expected to have immediate success. But the scientists did not look at the project in that light. This was because failure of an experiment as the basis of learning to do things better in future was not built in the system.

There were some who argued that the creation of a technical infrastructure at the site and the involvement of the social scientists

in the project would have made a great deal of difference to the project. Nayudamma had reservations in creating this kind of infrastructure. He thought the scientists would be isolated and frustrated. He also felt that they would lose touch with their subject. As an alternative, in order to attract and enthuse the scientists, he tried to create facilities conducive for work. He provided for the assessment and evaluation of scientists for the work done in such areas. He proposed special incentives for them but the Finance Ministry did not agree to the proposal. This was a terrible setback and it vitally affected the viability of Karimnagar Project.



Soon after launching the project, Nayudamma had expressed the hope that 'scientists and scientific academies will actively support, guide and associate with every endeavour to take science to the doors of the people who actually need it and in this way serve the society through science.' His hope was totally belied.

Nayudamma's dream of transforming the rural scene remained unfulfilled. The experiment failed because no laboratory took up the concept seriously and because there was little synergy among the stakeholders. The scientists lacked commitment to implement the project.

After launching the project, Nayudamma remained DGSIR for four years—long enough even for a government-sponsored project to take a concrete shape. But it did not. Everyone said the project was a great idea but it did not take off. Nayudamma probably did not pursue it aggressively. He depended excessively on the good conscience of the scientists. This was a mistake. Many felt that perhaps he was too soft and a little steel would have been in order. Had a more authoritarian DGSIR conceived such a wonderful project he would have made a difference and ensured its success. And, that would have changed India's rural landscape forever.

Nayudamma was unhappy that his colleagues did not share his vision and passion for integrated rural development. He was aware that the scientists let him down and thereby lost an opportunity to use CSIR as an instrument for the upliftment of the poor. In a paper he presented in January 1978 at a workshop conducted in Bangladesh, Nayudamma was openly cynical. 'Research organisations do not provide opportunities for researchers to go to villages, to identify people's needs and dovetail their research to these felt needs. In fact, wise men argue—let researchers do research at the laboratory benches, let others do rural development,' he said. In later years, when he reflected on the Karimnagar Project and wondered why it did not do as well as he had hoped for, or was dubbed a failure, one could see anguish and

a touch of sadness overshadowing his face.

Dr A. V. Ramarao who took over as director, RRL, Hyderabad in 1985 was keen to study the project in depth and take it forward. His visit to the project site however dampened his enthusiasm. He realised that even though many scientists had made innumerable trips to the site, spending huge amounts towards travel expenses, the project had remained a non-starter. He felt there was no merit in continuing the project on paper. It fell to his lot to take a decision and wind up the project.

In his inaugural address of the 93rd Indian Science Congress on 3 January 2006, Prime Minister Dr Manmohan Singh paid rich tributes to Nayudamma. Referring to Karimnagar Experiment, he said, 'Dr Nayudamma was among the first to urge scientists to step in and help in integrated rural development.' Dr Manmohan Singh was aware that even a critical assessment of the project for future learning had not been taken up. Therefore, he commented, 'It will be interesting to see what lessons were learnt by that experiment and how we can take forward that initiative.' Nearly nine years have elapsed after the Prime Minister's statement but there are no signs of the suggested review.

I hear, and I forget. I see, and I remember. I do, and I understand.

— Confucius

THE STORY OF A SCIENTIST ENTREPRENEUR

As the head of CLRI, Nayudamma trained many tanners. He had also encouraged quite a few of them to start industries. After he took charge as DGSIR, he tried to change the work culture in the national laboratories. If any scientist wished to start an industry using indigenous technology, he would be keen to support the venture.

When Nayudamma assumed charge of CSIR in 1971, Dr. Somaraju Suseela and her husband Rangarao were working in the National Chemical Laboratory, Pune. The year 1950 saw the beginning of the establishment of national laboratories across the country. NCL was first of them and the largest among the national laboratories under CSIR. Suseela had just begun her career as a scientific assistant to the solid state group in inorganic chemistry division. Her husband was in the polymer chemistry division.

World famous scientists such as Dr. Venkataraman, Dr. Sukhdev, Dr. K. P. Sinha, Dr. Narendrakumar and Dr. A. P. B. Sinha worked in NCL those days. Suseela worked for her Ph.D. under Dr. A. P. B. Sinha. Dr. B. D. Tilak was the director of NCL. As soon as the students completed their degree in NCL, they aspired to go to the U.S.A. and got busy in applying for post-doctoral research

fellowships. If the guide was influential, opportunities knocked at their door even before completing the degree. After a stint of two years or so in the U.S., they would return to NCL as pool officers, with their nose up in the air, and treat the local researchers like worms.

Suseela had not applied for a U.S. fellowship. Yet, she received an attractive offer of post-doctoral fellowship. She did not even ask her husband if she could go. She casually mentioned to him the offer she had received. Her husband was quick to react. He would not be able to leave his mother and grandmother and go to the U.S. 'Don't worry about money. I'll earn a lot of money in India itself,' he said. Then he turned boastful, 'Mark my words. I'll see to it that no less than four cars are parked in front of your house always.' She sighed and asked him to stand by what he said. In fact, neither of them was enamoured of going to the U.S. They had set their eyes on starting an industry of their own. They had decided to work in NCL until they could lay hands on suitable technology. Since they had no experience in marketing, they needed a product which had ready market. Their financial resources were limited and therefore they were looking for a product which could be produced without much capital investment. The technology must be somewhat complicated so that others would not copy it easily. These were their requirements.

The national laboratories were rife with the news of the new DGSIR. 'He is said to be a genius. He is introducing many new schemes. He says the laboratories should not be factories of fundamental research for producing doctoral theses. Instead, they should invent technologies, sell them to the industries, earn money

and pay laboratory staff salaries.' This was the buzz in NCL. There was also the talk that he had come out with an innovative scheme by which a scientist of CSIR laboratories who wished to start an industry using indigenous technology developed in the laboratory would be allowed to go on sabbatical for three years and, if unfortunately the venture failed, she would be allowed to return to his job.

Around this time, the Indian Meteorological Department, Delhi asked the solid state group for which Suseela worked to develop suitable technology for manufacture of temperature sensors for the upper atmosphere (radiosonde). The Meteorological Department till then had been importing the sensors from the US.

Within six months of their work on the temperature sensors, the group received encouraging reports. The samples made by the group worked as efficiently as the imported instrument. The group head was proud. He was so elated that he even held consultations with a few top industrialists of Pune for commercial production of the product. One or two of them visited the laboratory also. The group was very happy at their success. On 16 February 1972, while Suseela and her husband were walking back to their home from the laboratory in the evening, she shared her happiness with her husband. She said the group was thrilled at the success. This set her husband thinking. He said, 'Why not buy this technology and start the industry ourselves?' She replied, 'Yes, why not?' The project required close to one lakh rupees those days. That they did not even have five rupees with them then did not deter them. Instead, when they realised that they had identified a product,

which they could manufacture commercially, they felt euphoric. They were determined to set up the industry. They were not afraid.

Dr Somaraju Suseela prepared a nice letter asking for technology transfer, promising to pay the cost in instalments. She also asked for three years' leave. She handed over the letter to the director of NCL and a copy of it to her guide. She did not know what the director thought of her request. Her guide however did not look very pleased. 'This is an international product. Its success is of great importance for the country. It calls for experience. Greenhorns like you cannot handle it,' he said. 'Yet, let me see what I can do about it. Since you're my student, I'll try to help you.' His ambivalence did not dampen her enthusiasm. Instead, she felt smug that she had given the letter. In fact, she was under the impression that her guide not only supported her proposal but also would recommend it to the director. 'Money had to be taken care of. That's all,' she mused. She felt her friends had already begun to look at her as an industrialist. Some had gone as far as addressing her respectfully as 'Hello, industrialist' and embarrassing her a great deal. Four or five months passed. A friend who worked in the director's office brought her down to the earth when one day she whispered in her ear, 'Suseela, the director has not recommended your proposal! He has written to Delhi that the technology should not be given to you. He said it would be disastrous if the technology was not given to a big industry. Beware'

Suseela was distraught and ran to her husband. He too was upset. He thought for a while and said, 'I've had my suspicions about this right from the beginning. Go to Delhi at once and meet

the DG. He'll help us.

'Meeting the DG is not easy. Is it like going to the cinema or what? Why should he give me an interview at all? This won't work,' she said. Probably I'll write a letter to him.'

'You wouldn't lose anything by trying, would you?' he said. 'I suggest you take a chance and speak to him. I strongly believe that he will support us. Ask your friend in the director's office to help you talk to the DG.'

There were no cell phones or STD phones those days. One had to book a trunk call, and wait for three or four hours. A few seniors had direct phones and the director was one of them. When the director was away for lunch, her friend, who had told her what was happening to her proposal, and she dialled the DG's telephone number. Coincidentally, Nayudamma himself picked up the phone, when the phone was not answered by his secretary even after four rings, he having moved out of his cabin for lunch. After introducing herself, Suseela briefly explained her proposal and told him that she wished to speak to him in person. She said ten minutes of his time would do. This conversation happened on August 14. He said he was leaving for Russia on 17th and she could meet him in Delhi at 11 that morning. While thanking him profusely, she repeated her name so that it would register in his mind and informed him that she would certainly meet him on 17th. She and her husband left for Bombay immediately and there they boarded a train leaving for Delhi. They travelled without any reservation, completing the journey of 12 hours standing. They reached Delhi on 17th morning, very tired.

In spite of the arduous journey, they were in CSIR building well

before the time given for their meeting with the DG. At the appointed hour, that is, exactly at 11 a.m., Suseela and her husband were ushered into Dr Nayudamma's chamber. He rose up from his seat and welcomed them. For the next 15 minutes, Dr Suseela rattled off whatever she wanted to say non-stop. After hearing her attentively, he said the technology fee could be paid in instalments. He assured her that he would extend whatever help was needed for product upgradation. She had to resign the job though since the Finance Ministry had not yet cleared his proposal of granting leave for the scientists who wished to turn entrepreneurs under the Scientist Entrepreneur Scheme. He was nice enough to say that she would certainly succeed in her venture and, in the unlikely event of failure, he would help her in getting a better job than the present one. He said she could consult him on any problem so long as he was the DG.

Things happened at a fast pace over the next one hour. Nayudamma dictated a letter to NCL director asking him to transfer the technology to Dr Somaraju Suseela. He asked NRDC managing director to help her with the formalities and to enter into an agreement with her. He also wrote to the Government of Andhra Pradesh to provide all assistance to her for starting her industry.

Dr Suseela vividly remembers how they went to Delhi but she has no recollection of how they returned.

After returning from Delhi, she told each and everyone around what all transpired in Delhi. She told that Nayudamma invited both of them for dinner. Her guide who heard this told his friends. 'She tells the truth some times and lies at other times. Since she

mixes up the two, it's tough to know what to believe.'

When Nayudamma was visiting NCL about three months later, the director proposed to host a dinner in his honour and asked him to send a list of special guests to be invited on his behalf. Dr Suseela's name figured in the list received from Delhi. The administrative officer of NCL handed over the invitation card to her ceremonially placing it on a large tray. She celebrated the event by giving a party to her friends blowing away a month's salary. In the dinner organised in NCL, gazing at the top industrialists who had come from Bombay, Dr Suseela wondered, 'Do all moneyed people look handsome or would money covet the handsome people?' She is yet to find an answer.

Afterwards, Dr Suseela and her husband established the industry in Hyderabad. In 1975-76, presiding over a conference of RRL scientists and industrialists in Hyderabad, Nayudamma began his address with the salutation, 'Lady and gentlemen!' Everyone looked around to spot the woman. Dr Suseela was the only woman amidst about five hundred participants. She did not know what to do and stood up awkwardly, in a state of confusion. He introduced her to the audience proudly, like a father would introduce his daughter. 'We have a successful scientist entrepreneur amongst us,' he said.

'It is a wonder that we, who think of only chemical equations in our waking and sleeping hours, who are uncomfortable with the idea of money, thought of starting a small industry, started one and have been running it. Such was his greatness that when we were low on self belief, he believed in us the very first time we met him and gave us the right kind of encouragement at the right

time. He backed us and guided us in our effort,' Dr Suseela said. The great man's blessings have stood us in good stead. Even today, that is, well after 40 years, we are supplying the same product to the same department. We are happy that we not only have our own industry but also have the satisfaction that we provide sustenance to many families through our industry. Not a day passes in our life without remembering him.'

Nayudamma's legacy lives in the industry started by Dr Suseela and many other ventures, which received similar encouragement from him.

Give a man a fish and you feed him for a day; teach a man how to fish and you feed him for a lifetime

— Anon

THROUBLESHOOTING AT JNU

Nayudamma, who had returned to CLRI as distinguished scientist after serving CSIR for nearly 6 years, received a call from the Prime Minister's Office in April 1981. He was invited to take over the reins of Jawaharlal Nenru University as the Vice-Chancellor. He had returned to Madras in 1977 hoping to devote the rest of his life to research and find ways and means of helping the rural population, a subject close to his heart. He had settled down to a quiet life as distinguished scientist in CLRI. The invitation to head JNU, therefore, took him by surprise.

Indira Gandhi was sworn in as the Prime Minister of India for the fourth time on 14 January 1980. Even when she was out of power, she had kept herself abreast of the developments. She knew Nayudamma had tendered resignation as DGSIR in 1977 despite Prime Minister Morarji Desai telling him that he need not resign. Nayudamma had taken over as DGSIR in 1971 when it faced multiple crises and Indira Gandhi was aware how adroitly he had weathered the crises and brought about several structural changes in CSIR. She knew his penchant for carrying every section with him, having observed his people's skills from close quarters. His urbane manners, catholicity and the manner in which he managed the disparate scientists had impressed her. For some months, when Indira Gandhi was not the Prime Minister, Nayudamma

was her neighbour, living just a few blocks away on the same street and, during this period, even though she was not in power, he continued to maintain excellent rapport with her. When she was in deep trouble, she expressed a desire to seek the blessings of Kamakoti Sankaracharya, Paramapujaya Chandrasekhara Saraswathi Swamiji. Nayudamma escorted her to Kancheepuram without the slightest hesitation. When she met the seer, his advice to her was: Think good, be good and do good. This moved her so much that she cried. Especially after Sanjay Gandhi's death in June 1980, Indira Gandhi had been constantly looking up to people, whom she had known earlier, for help. When Indira Gandhi found JNU in deep straits, she remembered Nayudamma.

Only the first two Vice-Chancellors of JNU had completed their five year term. Parthasarathi was the first. During his tenure, which began in 1969, the campus was full of activity since the buildings and other infrastructure were coming up. This was the time when nothing could go wrong. Nag Choudhry, a nuclear physicist, who succeeded Parthasarathi, too completed his term (1974-79) but his tenure saw the Emergency with JNU emerging as a hotbed of anti establishment activities. He was at sea as an administrator. The University became synonymous with agitations and strikes. The teaching staff and the research scholars were behaving as though they were two warring groups. K. R. Narayanan succeeded Nag Choudhry but he was elected as the Vice-President of India within a short period. Therefore, he could not do much to stem the rot. The institution continued to suffer fissures and simmer with dissensions. There was a demand for Parliamentary enquiry. Indira Gandhi had no inclination to concede a Parliamentary enquiry into what was essentially an

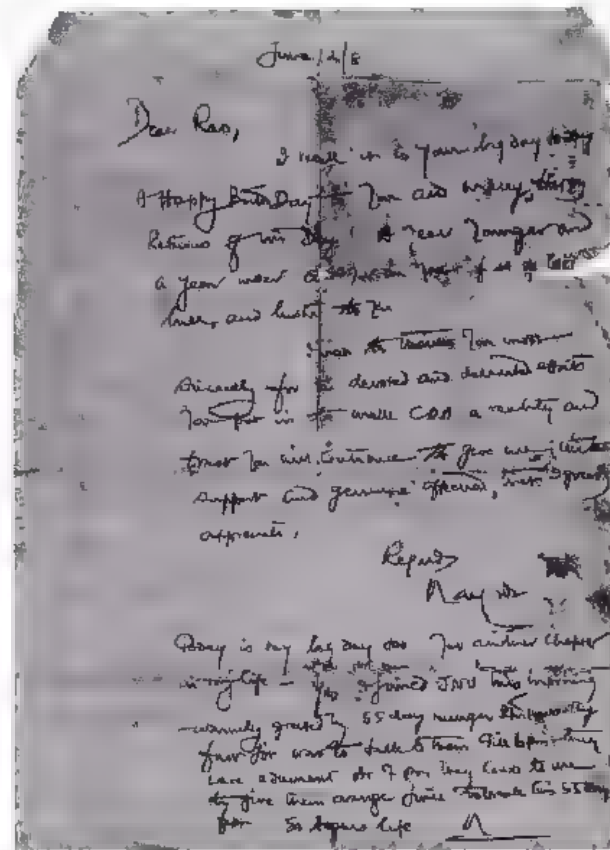
administrative failure. She also knew Parliamentary enquiry would mean discussions and deliberations without offering immediate relief. She knew time was the essence in the matter. Delay would mean the University would sink deeper in the morass from which it would be even more difficult to resurrect it. She wanted to arrest any further deterioration. Therefore, she chose Nayudamma as the Vice-Chancellor and allowed the tempers to cool in the Parliament and outside. She expected Nayudamma to carry everyone in the institution with him and solve the problems.

Nayudamma took charge as the Vice-Chancellor of JNU on 12 June 1981. That happened to be the birthday of Seshagiri Rao, his erstwhile colleague in CLRI. Nayudamma had made it a habit to remember the important events in the life of his friends, colleagues and subordinates and greet them on those occasions without fail. He wrote a letter to Rao wishing him on his birthday, the postscript of which is interesting. It reads: 'Today is my big day too. Yet another chapter in my life.'

'Yes, I joined JNU this morning warmly greeted by 55 day hunger strike. My first job was to talk to them. Till 6 p.m., they were adamant. At 7 p.m., they came to me to give them orange juice to break this 55 day fast. So begins life.'

Indeed, He began his life as administrator of a university, a new role for him. The job tested his skills to the extreme. He identified the problems that plagued JNU and their causes. He realised that the personnel policy in JNU was unclear because of which favourites could enter the institute through the back door and not on merit. He felt that the University provided an environment which was conducive for intellectual development but that very environment also was the cause of lack of restraint. The academic

and non-academic staff did not feel accountable for what they did and what they did not do. Reform was not possible because the Vice-Chancellor was not vested with any authority to discipline the errant lot. Nayudamma submitted a confidential report to the Prime Minister, which contained the diagnosis and the prognosis.



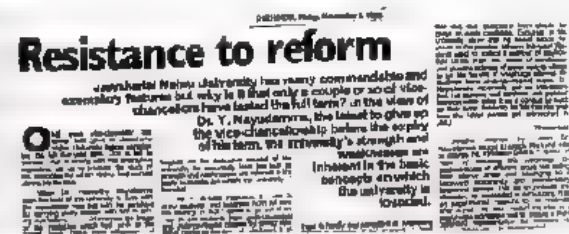
After 16 months of assuming charge as the Vice Chancellor of JNU, he quit.

The report that Nayudamma submitted to the Prime Minister has not seen the light of day but Nayudamma appears to have shared his assessment with his colleagues in the executive council of the University. In a report titled 'Resistance to reform', The Hindu newspaper of 5 November 1982 mentioned that Nayudamma had made a SWOT analysis of JNU. He stated that as an all India institution, it sought to draw teachers and students from all over the country. The administrative and academic work was decentralised to a great extent. The JNU produced qualitatively different products with its research scholars finding ready employment. It instilled a sense of responsibility among the students and research scholars because of which they would never turn violent even though they protested often. 'The JNU has overcome the weakness of colonial educational and intellectual dependence and has laid the foundation for an autonomous, self-reliant, academic and intellectual tradition,' he commented.

Nayudamma's report to the Prime Minister probably found fault with JNU's personnel policy and pointed out lack of clarity with regard to the authority and responsibility at various levels. New initiatives were difficult because of the resistance they encountered. Intellectual excellence bred arrogance. The teachers were beyond questioning. They were not accountable. The Vice-Chancellor had no authority in the matter of recruitment and promotions of the teaching faculty. The JNU was governed by an Act of Parliament, which necessarily meant approval of the government and Parliament for major initiatives and systemic changes. This involved lengthy procedure. It was also time-consuming. Therefore, he felt that the climate in the campus would continue to be vitiated by pulls and pressures from different

sections.

The Hindu commented: 'As can only be expected, the assessment of Dr Nayudamma was not shared by all sections on the campus. One section is of the view that he has not opted to exercise effectively the authority and power vested in him as the vice-chancellor.'



Nayudamma would tell his friends that he had accepted JNU assignment on the condition that he would first study the problems faced by the institution and thereafter would continue if he had the ability to bring about the desired changes. Once he realised that he had no ability or authority to bring about the necessary reforms, he resigned. The fact that he quit rather than look for solutions suggests that he was not confident of doing anything worthwhile there. He did not want to waste his time. He also must have felt that someone abler than him might resurrect the University. He hated to cling to the job and be a mere pen-pusher.

Was he a failure as the Vice-Chancellor of JNU? It is not easy to judge. He was a scientist first and administrator next. JNU was unlike any national laboratory or even CSIR. He was shrewd enough to know that he did not possess the ability to do anything concrete and so, after he diagnosed the problems, he left, hoping some other surgeon would sew up the things. He was gentle,

suave, progressive but not pugnacious enough. He was risk averse by nature. He always strove for consensus and such an attitude would be of no avail in dealing with the vertically and horizontally divided and fractious academic and student community of JNU. The assessment that he had not opted to exercise effectively the authority and power vested in him as the Vice Chancellor rings true. But N.V.S. Reddy, who is presently heading Hyderabad Metro Rail project and a Research Scholar in JNU during Nayudamma's tenure, has a different view. He vividly recalls that Nayudamma made it clear that he meant business when he told the intellectually arrogant professors and students of JNU when he took over as the Vice-Chancellor by quoting a Tamil proverb: 'If you are married to a devil, you better learn how to live on a tamarind tree.' This sent a stern message to the faculty, the students and the non-teaching staff and they started falling in line. A sense of discipline was brought to JNU which would otherwise get into agitation mode at the slightest provocation or on any perceived act of injustice happening anywhere in the world. N.V.S. Reddy believes that the unbridled academic freedom of JNU was so overwhelming that perhaps Nayudamma did not want to tinker with the intellectual traditions of JNU.

Perhaps the call of Madras was too irresistible for Nayudamma. He returned to the hallowed precincts of CLRI, where he was forever the revered mentor.

Nayudamma was happy to be back in Madras, his home.

Who dares to teach must never cease to learn.

— John Cotton Dana

FILIAL OBLIGATION

Nayudamma wanted his parents to live with him in Madras. They did not agree to this and continued to live in the village. They found life hard even the few days they had to be in Madras for some family function or for any other reason. They spoke no language other than Telugu and had difficulty in whiling away the time in Madras.

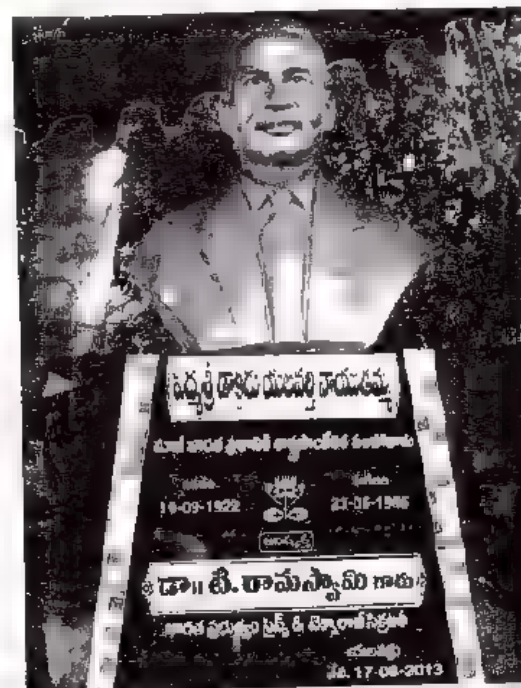
Nayudamma often remembered his father, who was gentle in manner and frail in appearance. Nayudamma loved him, was much attached to him. In his letter of 4 October 1984 to Seshagiri Rao, an associate for long years, he talked of his father. 'I think of my father at every step – an ordinary villager but with a most robust common sense. It is he who told me this: "When you climb up the ladder never forget the man who is holding it beneath because when you want to come down, he may be needed." Except for asthma, which bothered him severely during the winter months, Anjaiah did not know any ailment. He died in 1983 at the ripe age of about 85 years. Anjaiah had extracted a promise from his eldest son that he would perform his last rites wherever he was. Nayudamma was about to leave for Europe when he received the news that his father was critically ill. He cancelled his Europe trip, took a flight to Hyderabad and rushed to Yelavarru by road but,

sadly before he reached the village, his father had breathed his last. Nayudamma performed the last rites and returned to Madras. He wrote a letter in 1967 which reads more like a will. In that, he made a specific mention of only two persons—his father and Pavanabai, both dearest to him.

Nayudamma's ancestral house at Yelavarru remained absolutely the same tiled structure of one room and a hall even after he attained national and international fame. He spent a few days annually in this humble abode with his children, sharing it with his parents. After his father's death in 1983, Nayudamma wanted his mother to live with him in Madras. She was reluctant and continued to live in the tiled house alone. One day, in a great hurry and without any of his relatives knowing about it, Nayudamma, impulsively as it were, sold the house at much less than its market rate. He did this in order to compel his mother to leave the village and live with him in Madras. She was unhappy but, left with no choice, she moved out of Yelavarru.



Admirers of Nayudamma tried to buy back the house soon after his death in order to convert it into Nayudamma memorial home but the new owner would not part with it, despite the fancy price offered, saying the house proved lucky for him and brought him prosperity. The house is dilapidated and unoccupied now. Of course, Yelavarru village itself looks like a ghost village today, with the migration of most of the residents to the nearby urban and semi urban centres.



On 17 August 2013, Yelavarru wore a festive look. The prodigal son of Yelavarru had returned to the village after nearly three

decades in the form of a bust. Dr T. Ramasami, then Secretary, Dept. of Science & Technology, unveiled a bust of Dr Nayudamma in Yelavarru. Yelavarthy Subbarao, Nayudamma's uncle, was behind this initiative. Nayudamma's son Rathicish, daughter, Shanthi, son-in-law, Arun Santhosh, were present on the occasion.

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A home that does not give children love and affection, education that does not give them character and competence and a society that does not give them opportunity to grow have failed them.

— Nayudamma

THE TWILIGHT YEARS

Nayudamma had overshoot his self-imposed tenure of 5 years in CSIR by more than a year due to reasons beyond his control. Imposition of the Emergency was one of them. In the general elections that followed in 1977, Indira Gandhi lost power. The new Prime Minister Morarji Desai made it clear to Nayudamma that he had no objection to his continuation in the post. Nayudamma was only 55 years old and he still had several years to go for normal retirement from government service. But he stood firm in his resolve to quit.

In Delhi, he had to shoulder a heavy load of administration, involving public relations and actual entanglement with the bureaucracy. In Madras, he had time to reflect. He had grown somewhat philosophical lately. He was not like Lord Macaulay who said, 'I shall retire early; I am very tired.' Far from it, he bristled with many ideas which had relevance particularly to the rural population. He wanted to devote the remainder of his life to relevant research and develop technologies which would be applied for the benefit of rural population.

He had come up with the proposal of establishing a centre for development alternatives. The CSIR supported the initiative and appointed Nayudamma as the head of the Centre for Development

Alternatives as distinguished scientist. The objectives of CDA were to undertake and promote research on development alternatives for rural areas and application of science for betterment of the poor. It was to act as a catalyst and encourage voluntary agencies to adopt technology delivery systems and take science and technology to the door of the needy. Another objective was to promote rural and agro-based industries, particularly leather and allied industries, and betterment of the workers engaged in these industries. The CDA proposed to devise and implement simple ideas which would transform the lives of large target groups in rural areas.



Nayudamma with his second son Ramesh, daughter Shanthi, Pavanakshi, daughter-in-law Uma and Rethaiah

Nayudamma knew what he wanted to do, what needed to be done and how. He had seen how technology had spectacularly raised the standard of living in the developed countries. He was acutely aware of how the same technologies failed to produce similar results in the developing countries. He was not opposed to basic research. He was aware that basic research produced breakthrough results. Yet, it was his firm conviction that India

needed technology which had relevance to the needs of the people. This was done in CLRI successfully. Now he proposed to unveil practical technologies on a larger scale for overall rural development through CDA.

As DGSIR, he had organised an international symposium on technology transfer. He was responsible for concluding the CSIR-UNIDO Agreement of 1972. He was a member of a small group of experts entrusted with the preparation of the Fourth General Conference of UNIDO in 1984. He particularly stressed transformation of agricultural resources into products and conversion of slaughter house products from hoof to horn. In continuation of this line of thinking, one of the projects conceived by him under CDA related to meat handling system with forward and backward linkages, from raising the animals in the grazing lands to slaughter houses and delivery of meat to the consumers. This project did not take a concrete shape during his life time. The International Development Research Centre, Canada had discussed the project in the Board meeting he attended in Ottawa in 1985 but the decision to fund the project was taken after his demise. The economics research division of CLRI under Seshagiri Rao handled the project following Nayudamma's concepts and guidelines. The results of the study were startling. The farmers who raised the animal for 8 to 10 months got about 60% of the value realised at meat production point while the middlemen at various points realised about 40% for their work of just 48 to 72 hours. This offended distributive justice. The study suggested an alternative model for hygienic production of meat with maximum gain to the farmers and full recovery of by-products. The model

was put in practice by setting up a viable mini meat production unit in the neighbourhood of Gudur, Andhra Pradesh. Impressed by the results, the Planning Commission of India included this model in the Eleventh Five Year Plan, allocating funds for its replication in the other States of India. Obviously, Nayudamma's vision continues to provide valuable guidance to the government on rural development even now.

Nayudamma believed that the traditional thinking that 'agriculture is for food' and 'forest is for wood' has to change for good. Apart from food and food processing, every part of an agricultural or a forest plant can be utilised from 'leaf-to-root'. A cluster of industries can be set up around each plant. For example, many industries could be set up around a paddy plant, he said. Straw may be used for making card boards, wrapping paper, roof thatch, bed for mushrooms, apart from using it as animal fodder. Paddy husk may be used as fuel and the resultant ash for producing sodium silicate, solar grade silica, silica sol, ceramic materials and refractories and cement like products. It can also be used for making particle board, activation carbon, furfural, fillers and extenders, fire-resistant compositions, paddy husk bricks and animal feed. Rice bran is extracted for oil for edible and non-edible purposes. Rice as such is used for food and in production of beer and wine. It also is used in several starch-based industries. Likewise, twenty-five industries revolve around sugarcane and 7 to 12 around cotton and groundnut, Nayudamma said. A cluster of industries could also revolve around animals by utilising 'hoof-to horn'. This also applies to fish and aquatic plants. There should be no such thing as waste. A rich country is one that converts waste into wealth. These were his views.

'Systematic studies may give a clue as to what optimal blend of plants, animals and people can stay on an hectare of land getting the maximum returns from all these resources,' he said. In pursuance of this line of thought, a think-tank comprising chemical engineers, economists and social scientists was set up in Madras under the leadership of Dr Gopichand of Madras IIT which was asked to study the paddy crop and identify its full potentiality for economic exploitation from root to leaf. The group identified about 100 products that could be derived from the paddy crop by setting up processing units close to the crop production regions. The exercise envisaged large benefits to the rural communities.

Nayudamma's career as distinguished scientist evolving appropriate technologies for rural development had to take a break in June 1981 when Indira Gandhi invited Nayudamma to take charge as the Vice-Chancellor of JNU. He returned to Madras 16 months later to pursue his first love of research for people, finally retiring from the government service in September 1984. He wrote a letter to Seshagiri Rao on 4 October 1984 from UNIDO, Vienna. He said, 'At last I am a free man' Free from the government at any rate' He thanked Rao for being so nice to him. 'Words fail me to thank you for your extraordinary kindness, courtesy and care ... I feel greatly indebted to you and to your colleagues for all that you have been in my life.' He ended the letter saying, 'I am born lucky in life, in love and in friends I hold. Thanks to people like you for making it so.' He was effusive in expressing his gratitude, so uncharacteristic of typical bureaucrats and scientists who routinely and shamelessly take credit for what is legitimately due to their subordinates.

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my dear Rao,
 Ojayedassani Greetings!
 At last I am a free man! free from the
 government at any rate!
 It is strange, how strange of my
 father at every step an ordinary village
 but with a most robust character - he
 is the true fool, when you climb up
 a ladder, never forget the man who was
 holding the ladder for you... (because when
 you want to come down, he may be needed)
 People who succeed sit on the shoulders
 of others - how does one express one's gratitude
 to such people who work so willingly
 so devotedly and so steadfast?
 I have said no to thanks
 for for your extraordinary kindness!

Nayudamma was advising Andhra, Tamil Nadu and Karnataka governments on governance, industrial policies and rural development.

For twenty years, he was a senior consultant and advisor to many UN technical agencies – first to FAO, then UNDP, UNIDO

and UNESCO. More than fifty developing countries sought his advice on leather technology and efficient use of animal by-products as also on a wide range of issues relating to science and technology policy and industrial and human resource development. His international assignments continued, with many world bodies seeking his wise counsel. He would visit Delhi *en route*, meet old friends, bureaucrats and ministers and share with them his thoughts on the problems facing the country.

During 1983-84, he was the chairman of Educational Consultants India Limited (Ed.CIL), a public sector enterprise. He visited Delhi for 2 or 3 days a month. He was conscious that Ed.CIL was a fledgling with meagre means. So, he fixed the meetings of the board of directors of Ed.CIL to coincide with his visits abroad or other meetings in Delhi and he never charged any expenses to Ed.CIL. When he was informed while on a visit to Vienna that the concern had earned its first profit within two years of his stewardship, he promptly wrote to the government that he wished to relinquish the chairmanship in favour of the managing director who, he said, had the competence to take Ed.CIL forward.

As president of COSTED (Committee on Science and Technology for Education and Development) from 1980 to 1985, he rendered invaluable service to the cause of technical co-operation among the developing countries. He generated a most favourable impression among the stakeholders through his prompt and constructive reaction to all worthwhile projects sent to COSTED. As a firm believer in mobilisation of international community to serve the purpose of the Third World development,

he arranged compilation of an international roster of scientists and technologists in the new technology areas on behalf of COSTED.

As a member of the board of trustees of IDRC, Canada and later as its Governor, he made a stellar contribution to the promotion of technology diffusion in the developing countries.

Nayudamma played a seminal role in the development of the Technology Policy Resolution of Government of India in 1982.

UNIDO benefited from his association as a consultant right from 1967. He had a lot to do with UNIDO's assistance to various countries. His last major study for UNIDO was on China which, it is said, makes a remarkable reading.

Nayudamma travelled a lot in fulfilment of his national and international engagements. Valluri S. R., head of Aeronautical Development Agency, his friend for many years though much younger in age, met him in Bangalore in 1983 where Nayudamma was heading a committee to review the functioning of the IIT. Earlier Valluri had met Nayudamma in Bangkok where he was advising the Thai government. Yet another time, Valluri ran into him when he was returning from Canada and the U.S.A. All these were within a span of three months. Valluri, who knew that Nayudamma was already pushing 60, asked, 'How long are you going to do this?' Nayudamma gave a wry smile and replied, 'I must go on.'

'All of you are more than aware how for values of sobriety and propriety, I have refrained from commenting on the institutions and offices I left. This is in spite of repeated requests and commands from the industry, institute and the decision makers and in spite

of being misunderstood by all,' Nayudamma said in his speech on the occasion of the 25th Tanners Get Together, 1984. This is the dignified restraint with which he conducted himself after retirement from the government service.

He was the most graceful person, going out of his way to help one and all. He was blessed with the gift of making friends easily. His wide spectrum of friends and acquaintances included the Central and State ministers, diplomats, officials high and low—industrialists in the public and private sectors, film and theatre artistes and eminent persons in the international bodies in the UN system and various countries.

Since Nayudamma dealt with national and international bodies throughout his career, it would be quite natural to expect him to focus on only large issues and big projects. But Nayudamma was different. He cared for the big and the small in equal measure. When he received a letter from a woman from Chirala, a small town, seeking his advice on starting a cottage industry by a women's group, he replied to her promptly in his own hand in Telugu.

Nayudamma's letter to Mrs. Padmavathi (Translation)

May 20, 1985

Dear Smt. Padmavathi,

Greetings! I returned from Vienna yesterday, saw your letter, and noted its contents.

I am indeed glad to know about the programmes of the women's group. There is nothing that cannot be done if women take the lead. My congratulations to your self-help group. I shall be happy if I could be of any assistance to your group.

[illegible]

You or anyone from your group may meet me and discuss the issues when you are in Madras.

Yours sincerely,
Nayudamma

P S. I travel a lot in India and outside these days. If I am not in Madras when you come here, you may contact K. Seshagiri Rao or Radhakrishna who are my associates and discuss your problems with them. I'll be away on a foreign tour from June 10 to 27

The reply must have been a huge encouragement to the woman. Another letter to her followed soon afterwards suggesting to the group to start a cashew based cottage industry project since cashew was grown in abundance in Chirala area.

When Seshagiri Rao, his erstwhile colleague in CLRI, was leaving for Argentina and Brazil on an official tour from June 24 to July 5, he requested Nayudamma on 22 May 1985 to help him out with his contacts in those countries. The very next day, Nayudamma sent him a note of two pages listing out his friends and what help they could be of to him together with letters of introduction. A month later, Rao left for Argentina.

Nayudamma left the country on June 10 to attend COSTED meeting in the USSR and from there to attend IDRC Governors meeting on June 21 in Ottawa in what turned out to be a fateful journey.

Science is to be judged by its excellence; technology by its contribution to social and economic development.

— Nayudamma

WARTS AND ALL

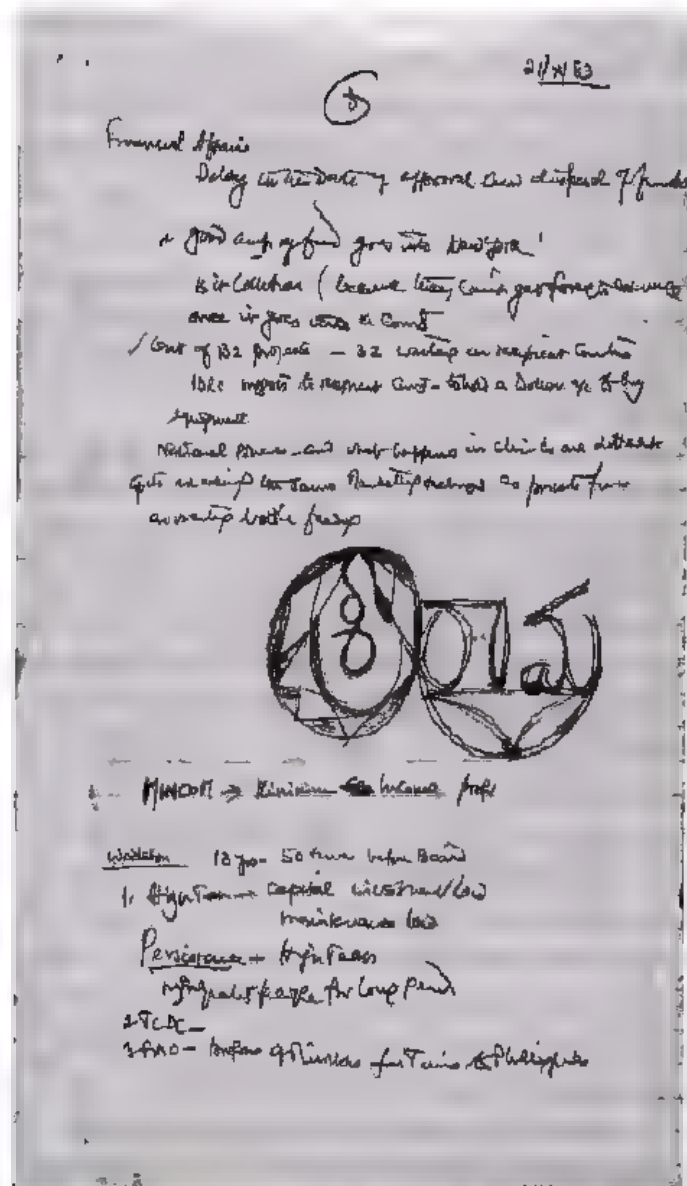
Nayudamma was not religious. Visiting temples, idol worship, performing puja and rituals were not part of his life. But despite his dislike for godmen and miracle workers, he was not opposed to those who were religious so long as they did not try to impose their religious views on him or bring their religion to office. When Nayudamma visited a godman, prodded by a friend, as usual, the godman produced *vibhuti*, holy ash, for the visitors. Nayudamma stood in front of the godman with folded hands and requested him to produce a blade of grass between his palms, adding that that indeed would be a miracle. As the story goes, he was shown the door. His colleagues recall Nayudamma's comment on godmen. 'I'd believe someone to be a godman if he produces a pumpkin instead of *vibhuti* out of nothing.'

When he was DGSIR, he came across an article by a reputed scientist and advisor to the government in support of a godman and his miracles. Nayudamma's conscience as a scientist was offended and he wrote to Prime Minister Indira Gandhi inviting her attention to the article. She replied that she had to bear many such crosses in running the country. She was then agnostic. In later years, she probably turned a believer. On her birthday in 1980—the year Sanjay Gandhi died—she performed puja early in

the morning to the priest's chant. She of course justified that she did it to please her aunt. It was known that she had become religious and had begun to seek the benediction of many seers. After Indira Gandhi lost power in 1977, she called on Paramacharya Chandrasekhara Saraswathi of Sankara Mutt. Nayudamma accompanied her to Kancheepuram. It is unlikely that he would have gone to visit the seer alone. As an aside, it requires to be said that he was so impressed with Paramacharya's simple living and profound thinking that he turned an admirer of the seer and recalled his sagey advice now and then.

Nayudamma was a rationalist. He vehemently opposed superstitions. His essay titled, 'Science and Superstition' is a marvellous treatise on the subject. He begins the article rhetorically: 'When mystery men and miracle workers are making their presence increasingly felt, when from thin air masterpieces of modern technology are credited to be created, when some claim the power of foretelling the future and others the ability to forestall it, as a student of science, I must confess I am clearly confused and concerned.' He proceeds to mention that he read as many as 13 books on superstition before he wrote the essay and was astounded at the existence of such vast literature in English on the subject. The essay ends with an impassioned plea to the scientists: '(The Indian scientist) has to make a determined effort to replace antiquated values, prejudices and superstitions with knowledge based on rational thinking. But in doing so, he should not expect miracles as science and miracles do not go together ...'

It is rather difficult to cast Nayudamma in a particular mould. Even though he was not religious in the conventional sense, he



would always begin his day in the office ritualistically by inscribing on the file or note pad 'Sri', short for 'Srirama' in Telugu script. If the note sheet of the file bore that inscription before his minute, or decision, without doubt, it was the first file he cleared that day. Even in international conferences, he wrote 'Sri' on the scribbling pad the first thing when the deliberations began. Writing 'Sri' or 'Srirama' is a ritual among the traditional Telugus who consider beginning the day by writing 'Srirama' auspicious. Nayudamma extended the ritual by inscribing the word 'Srirama' in calligraphic style with circles and other interesting shapes, embellishing the sketch if the proceedings of a conference or a meeting were dull or too routine and prosaic. The doodling is so artistic that perhaps he would have made the grade as a painter had he taken to painting as a profession or even a hobby.

Nayudamma was a charismatic person. He attracted people like magnet, his bewitching smile endearing him to one and all. He never had a grudge against anyone. No enemies. If anyone was angry with him, he would rush into his room angrily, loudly saying that today he would settle the matter with him once and for all. He would yell at him, only to emerge out of Nayudamma's room a little later, sporting a broad smile on his face and wondering why at all had he entered the room in the first place. Nayudamma was utterly charming.

He was most unostentatious, simple, warm and gentle. No airs about him at all. He was easy to converse with. Even when someone talked to him for the first time in life, he would go away with the feeling that he had known him all his life. He mesmerised people with his good nature. He was honest, forthright, without ever

being offensive or abrasive. He would not blame others, even where blame had to be assigned. Consider his comment on July 8 on a file (*minute*, as the jargon goes) when he was DGSIR:

'I do not understand or appreciate who gave us the right to hold the merited scientists at ransom and delay their career prospects for 1 year. I am utterly unhappy

'If this is the way administration has to operate and justice to be done by CSIR— all of us dealing with this file should have no place in CSIR.'

*I do not understand who or what
has put us in this position to hold the merited
scientists at ransom and delay their
career prospects for 1 yr. I am utterly unhappy.
If this is the way admin. is run
by CSIR— all of us dealing with this file
should have no place in CSIR.*

Evidently, he was furious, indignant. He felt CSIR had committed a terrible wrong. Yet, his language was well chosen, expressing only anguish. He did not blame anyone in particular and said CSIR should not be the refuge of the perpetrators of injustice, employing words in a self-deprecating manner. He was too gentle to cause offence to anyone even when he was in a rage.

Sanjivdev, the painter-philosopher, who had a long chat with him in March 1980 in Nagaram, observed that Nayudamma would employ words such as 'perception', 'conception', 'analysis', 'synthesis' and the like in his discussions while explaining his views on science,

technology and art rather than words which were too strong. He would consciously avoid words such as 'undoubtedly' and 'certainly'. He believed in being gentle and chose words in sync with his nature.

His empathy for the poor was genuine. After his promotion as deputy director of CLRI, he thought he had settled down well in life and began to earmark his salary of one month every year for education of the poor. This continued all his life. But he kept this to himself, his good deeds coming to light only through the beneficiaries. When he was CLRI director, he gave a peon's job to a Harijan boy, who had passed S.S.L.C. He noticed the boy's zeal, helped him with money, and made him study privately. The boy went on to acquire a postgraduate degree. He eventually became a division head in CLRI.

He would expect the scientists and other staff to meet him only with prior appointment. Visitors too were expected to fix up an appointment and meet him at the time given. Once he gave time to someone, he made himself free to meet the visitor at the precise time allotted to him and wait for the visitor to turn up. When he was with the visitor, he would be all ears, listening to him attentively and patiently. He would not brook any disturbance from anyone. 'I do not like to keep anyone waiting nor do I like to be late for any appointment. If you give time to someone and if he is with me, it is his time — there should be no disturbance.' This was the written directive to his personal secretary. His compassion and special concern for the under-privileged lot was all too evident in the matter of appointments too. If his visitors were tanners and that too from among the under privileged

sections, no prior appointment would be necessary. They would always have a right over his time. Students also enjoyed similar privilege. If the students barged into his room, even when he was in the midst of a meeting, to remind him of the lecture session, he would not mind their intrusion. He would promptly close the meeting and walk out with the students. The tanners and students always felt that he was their Nayudamma, their benefactor. In CSIR also, he followed a similar policy. He had always time for the less fortunate while his elitist visitors had to follow the procedure.

Articulation was his strength. He was persuasive, pleading his cause well, employing precise and carefully selected language, facts marshalled well and the speaking points noted. He was an eloquent speaker and had the gift to express things in a manner which one could not easily refute. He was humane and had the social grace to impress people with his humility and pleasing manners. He was never brusque.

Although Nayudamma was quiet and reticent in official matters, to the discerning eye, his qualities of justice, fair play and rectitude were obvious. He would speak to the scientists and staff when he was in office only in English. He would not make a concession even to those who were Telugu-speaking, not yielding to the temptation of talking to them in Telugu, his mother tongue. He did not wish anyone to gain an impression that he was provincial, parochial or partial. Such was the care he took to remain above suspicion in his official work. In contrast, he was an extrovert in private meetings and parties. Everyone felt at ease in his presence and enjoyed his humour, punches, sarcasm in unofficial gatherings. It is a wonder how Nayudamma managed to separate his personal

and official life with such clinical precision.

Having said that he was not provincial, it needs to be mentioned that perhaps the only time he made his bias apparent in official matters was when a new CSIR centre was proposed to be set up. He wanted it located in Andhra Pradesh, his home State. The technical team was against it. When the impasse continued, he convened a meeting to sort out the matter. The technical appraisal team did not have a foolproof case. Much could be said on either side. When they realised that their objections were not strong enough, they turned nasty. They said there were already several CSIR units in and around Hyderabad and it would be inadvisable to locate one more unit there. Moreover, fairness demanded allocation of resources to another State. Nayudamma saw through their game. In a measured but firm tone, he said, 'Yes, DGSIR has been told there are already many CSIR centres in Andhra Pradesh. He wants one more there because he is from Andhra Pradesh.' It is another matter that eventually the centre was established in a different State due to valid technical reasons.

His written instructions to his private secretaries in CSIR reveal the man. He said, 'On the telephone, you should be extremely polite; you can ruin the reputation of DG and CSIR if you are harsh/ impatient ... When a person writes to me— whether he is small or big, a director or a scientist or a sweeper - then a reply should go on my name signed by me within 3 days maximum.' Another instruction is a gem: 'P.S. should exercise the privilege which I give, to look for and tell DG where he thinks DG has gone wrong or there is a better way of doing a thing. I give this privilege always to my secretary.' How often do we not find swollen heads

in the higher echelons of bureaucracy, who reach the top generally by sheer seniority? But here was a man who did not think he was infallible despite sitting at the top due to his merit and not just seniority.

Joseph H. Husle, Vice-President of International Development Research Centre, aptly said, "Pascal wrote: 'The strength of a man's virtue should not be measured by his special exertions but by his habitual acts.' Nayudamma's habitual acts were acts of gentleness, generosity, thoughtfulness and caring about the needs and concerns of others."

One criticism against Nayudamma, which he could not wish away, was that he would not force changes even after being convinced that they were good and necessary. He was not the kind to impose his opinions on anyone. It was characteristic of him to nudge, persuade, convince and convert. He would not nag. His son, Rathelsh, made a confession: 'My father spoils us by being too generous and liberal.' Nayudamma's interaction with Hajee Md. Ghouse also illustrates this trait. During one of his tours of North Arcot district, Nayudamma stayed overnight at the bungalow of Hajee Md. Ghouse Saheb in Pernambut, whose tannery in the 1960s was well known for quality cow hides. Next day, in the course of his visit to the tannery, Nayudamma suggested to Hajee Saheb to switch over to finished leather because that would be more profitable. Hajee Saheb's response was prompt: 'Dr Nayudamma, we are happy and honoured that you and your scientists visit us. If I accept your suggestion and switch over to finished leather, I would have to run to CLRI for everything and be at the mercy of the scientists. Do you want me to change over?'

Nayudamma knew the logic of Hajee Saheb was flawed. Yet, he did not contradict him. Instead, he was gracious enough to laugh heartily and tell him to stick to what he was doing.

When some employees complained that those who did good work did not get due recognition and to rub salt on the wound they were loaded with more work, Nayudamma snapped, 'The reward for good work is more work.' He did not wish to flog a dead horse. Truism in government but he said it so well.

The editor of 'Science to Science' journal was on a visit to Madras. He was down with heavy cold and fever. Yet, as per his scheduled programme, he reluctantly visited CLRI, just to say 'hello' to the director. He wished to get away within a few minutes after a very brief interview. He expected the director to be an old man. But to his surprise, he found himself face to face with Nayudamma who was quite young. The editor casually asked Nayudamma if he had any frustrations. 'Yes,' Nayudamma said. The editor braced himself to listen to a litany of complaints against all and sundry, including the old guard in CSIR. Imagine his surprise when Nayudamma said, 'I am hugely frustrated that I am unable to remove the social stigma attached to those associated with the leather industry.' The effect of this reply on the editor was immediate: he turned an admirer of Nayudamma.

Nayudamma was aghast at the way some people in the society were treated as outcasts. He would not tolerate anyone, high or low, who supported the pernicious caste system. An incident involving a high dignitary would bear this out. Even though Nayudamma was only a deputy director in CLRI in the 1950s he had established a personal rapport with Tamil Nadu Governor

Sriprakasa, who was from Varanasi. Sriprakasa was curious to know Nayudamma's caste, which he tried to guess but failed. He had a vague feeling though judging from Nayudamma's passion for the leather industry and his closeness to the tanners that he might be from a low caste. His secretary too could not throw light on the matter. Unable to contain his curiosity, one evening Sriprakasa telephoned Nayudamma and asked if he might know his caste. Nayudamma could as well have revealed his caste. He did not. Suppressing his indignation, he said, 'By profession, I belong to the community of untouchables.' Sriprakasa sensed the anguish in Nayudamma's voice and immediately put down the phone. After five minutes, he telephoned Nayudamma to express his regrets for the faux pas.

Religion for him had nothing to do with one's conduct and official work. He remained steadfastly secular all his life. Nayudamma and Dr Husain Zaheer, who was his predecessor as DGSIR, were great friends and their mutual admiration was the talk of the scientific community until Zaheer passed away in 1976. While recognising merit, he did not look at the candidate's religion even if it meant treading on the toes of influential people. This was amply demonstrated in the selection of a person for a post when M. G. Ramachandran was the Chief Minister of Tamil Nadu. Nayudamma was the chairman of the selection committee for choosing the Director of Madras Institute of Technology. This was a position which only the persons of a particular caste had occupied until then. The selection committee on this occasion short-listed Dr Mohd. Sadiq for the post. This was unthinkable for the people of that caste. Naturally, they were agitated and

approached R. Venkataraman, then a minister in Delhi. He spoke to MGR and brought a lot of pressure on him. MGR invited Nayudamma over for breakfast one day and confided in him the intense pressure that was brought to bear on him. After listening to him with sympathy, Nayudamma said the committee had selected Dr Mohd. Sadiq purely on merit and, having signed the recommendation, the committee had become *functus officio* in the matter. He graciously suggested a way out. The government was free to overrule the recommendation, scrap the committee, constitute a new one and ask for a fresh panel. What MGR thought of all this is not known but soon afterwards he approved the name of Dr Mohd. Sadiq.

When the occasion demanded, Nayudamma could employ his wit to deadly effect. Prime Minister Indira Gandhi had taken a meeting of eight or nine directors of the national laboratories. CSIR was in ferment then, after Man Mohan Suri had left CSIR. Hari Narayan and G. S. Sidhu, directors of two other national laboratories under CSIR, had sent in their letters of resignation. It was a frank discussion where the Prime Minister tried to elicit the views of all the directors. Nayudamma, Director of CLRI, put across his view succinctly. 'Madam, Draupadi was accountable to only five husbands but I cannot count how many people the director of a national laboratory has to satisfy.' To say a thing like this to Indira Gandhi certainly called for guts. How could anyone be so irreverent in her presence? Indira Gandhi ought to have scorched the man with an angry stare. But the manner in which Nayudamma said this must have helped the situation, for Indira Gandhi merely smiled and allowed it to pass. On another occasion,

speaking about the condition of the directors, he said, 'While Draupadi had five husbands to serve, she also had five protectors. Could the same be said of a director of a national laboratory?'

N. T. Ramarao, Chief Minister of Andhra Pradesh, who in 1983 appointed him as honorary industrial advisor for the State, was the recipient of Nayudamma's distilled wisdom in plenty. His advice was not confined only to the matters relating to industrial development. Of particular interest is the letter he wrote to NTR on 6 August 1983. He was to leave for Paris and Vienna on July 30 but the doctor advised him to lie flat on his back, as a cure for backache - an affliction that bothers many tall people. The letter to NTR is illuminative, covering many aspects of statecraft. His advice to NTR, 'Think good, Be good and Do good,' was the same mantra which the Paramacharya of Kanchi Sankara Mutt had dispensed to Indira Gandhi when she had visited the seer. 'The most important point is that let us not fritter away our energies on mundane small matters. It is not for you to worry about day to day administration. It is for the Secretaries. Concentrate on large programs that are visible to the public,' he advised NTR. On weeding out corruption, he said, 'Quietly a net must be spread to catch a few major black marketeers... and publicly hanged.' There can be no doubt that Nayudamma was naïve to suggest this. In fact, his advice was reminiscent of Nehru's response, who in 1945 had said that the Congress Government in independent India would publicly hang the hoarders from the nearest lamppost.

Nayudamma's wisdom was in full view when he accompanied NTR on his first tour of the U.S.A. a few months after his election as the Chief Minister of Andhra Pradesh. Nayudamma prepared

possible questions and answers for use by NTR during the tour. The idea was that NTR should come up with the right responses and project a good image of himself in America. Nayudamma was particularly worried that NTR might indulge in vitriolic responses to questions on Prime Minister Indira Gandhi, who was his *bête noire*. NTR, who had prodigious memory, could remember and recall two to three pages of dialogues verbatim without a mistake after going through them just once. As expected, at a press conference, one question was: 'You and Madam Gandhi belong to opposite parties with fundamental differences. How do you manage to deal with her?' In the absence of proper briefing, NTR would have indeed gone ballistic against Indira Gandhi little realising that he was in a foreign country. Nayudamma's briefing that on foreign soil internal differences and wrangles had to be pushed under the carpet had prepared him well. Having memorised Nayudamma's stock replies, he said, 'I'm only a Chief Minister of one State in India while she is the Prime Minister of the entire country. We may have differences on certain issues but the national interest is at the heart of both of us.' The press was impressed. His replies were acknowledged as wise and statesman-like.

Nayudamma was well known for his sense of humour. He was full of jokes, witty, fun loving and at times sarcastic. During his tenure, CLRI had the tradition of organising monthly picnics for the employees. In one such outing, just before breaking up, he chivalrously offered to give lift to the ladies in his car. He turned to a newlywed couple and asked the man, 'Do you mind if I take your wife along with me?' Pat came the reply, 'Yes, sir. Nayudamma was taken aback. 'Don't you trust me?' he asked. The man politely

said, 'I do trust the director but ..' He paused and Nayudamma completed the sentence for him, 'not Nayudamma. This incident should not be construed to mean that he had a roving eye; he probably was mildly flirtatious.

He was a prankster, his younger colleagues often being at the receiving end of his practical jokes. Once, a visitor from the Soviet Union was put up in a hotel in Madras. Nayudamma asked two of his colleagues to go to the hotel and escort the visitor to CLRI. He told them, 'Hey, you guys go and get the girl.' The guys were young, in mid-twenties. They turned up, smartly dressed, at the hotel, in a jolly good mood looking for the 'girl'. They waited in the hotel lobby for ten suspenseful minutes when out walked an elderly lady. Their jaws dropped. After the visit was over, Nayudamma accosted the two young men and said, 'I say, this girl liked your company very much and she has written me to thank you.' The two, who now understood his 'American' expressions, did not fail to notice the glint in the eyes of the boss. With him around, functions outside office hours were bolsterous and lively.

Whichever office he held, some things that Nayudamma said remained constant. He was fond of saying: 'If I trust a person once and he betrays me, he is a fool because he has lost my confidence in him. If I trust the same person a second time, then I am a fool since the person had already warned me.' This was more an advice to others, for Nayudamma was rather naive; he remained the credulous type all his life.

When someone sought approval for his proposal in strong language, he would fall back on Kamaraj, Tamil Nadu Chief Minister, who had a way of countering the clever bureaucrat by

asking: 'You've given me the reasons why I should accept your advice and the advantages thereof. You haven't told me the consequences of not accepting your advice.'

In matters of public expenditure, Sir Lakshmanaswami Mudaliar was his guide, whom he often quoted: 'When public money is entrusted to your charge, deliberate if and how you would spend it if it was your own hard-earned one.' He was a staunch believer in his guru's dictum and practised it to the hilt.

French President Charles de Gaulle was tall but J. K. Galbraith at 7 feet was taller by half a foot. Charles de Gaulle and Galbraith sat side by side during the funeral of John F. Kennedy, the U.S. President, who fell to the bullets of an assassin. In his brief chat with Galbraith, Charles de Gaulle pompously asked what distinguished them from the rest of the humanity. Galbraith didn't like the man's pomposity and in a rebuking tone said, 'First, we are more noticeable than others and second we must always be more virtuous than others since everyone can see us and we cannot hide.' Nayudamma was tall by the Indian standards and he had nothing to hide. He lived a virtuous life. He achieved much in life, his work earning him considerable fame. He received many accolades from all over the world. Yet he remained simple, amiable and modest. Fame in fact sat lightly on him.

One of Nayudamma's oft-repeated statements was: 'I have not applied for any job nor attended any interview for any post at any time.' For a man who began his life in humble circumstances, his was an eventful journey. He occupied high positions with élan and great distinction when he was still very young. Considering that both his parents lived for about 85 years, genetically perhaps he

had many years of life but fate willed otherwise. He died too soon; death— like the posts he occupied— also embracing him too early. Nayudamma sought to accomplish many difficult things. He achieved a lot but there certainly was much more which remained unfinished when death suddenly snatched him from this world.

And how?

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Life is a sea upon which the proud is humbled, the shirker is exposed and the leader is revealed.

— Nayudamma

7:14 GMT, 23 JUNE 1985

23 June 1985. Air India Flight 182, named 'Emperor Kanishka' after the king of Ancient India, from Montreal to Delhi via London, was flying comfortably off the Irish coast. The flight crew made the first contact with the Irish air authorities at 07:06 GMT while the aircraft was over the Atlantic Ocean. At 07:14 GMT, the plane was flying 110 miles south-west of Cork. A blink and the plane disappeared from the radar screens. There was no Mayday call. It simply vanished. No contact with the control tower. Shannon air traffic controller swung into action and asked the planes flying in the surrounding airspace about the missing plane. Then the Irish radio broadcast an SOS at 09:44 GMT about an Indian plane going down. Nineteen ships responded to the SOS. Many aeroplanes and helicopters joined the search.

Laurentian Forest vessel arrived at the crash site at 10:02 GMT, the first to do so, for what was initially thought to be a rescue operation, which in the end turned out to be a heart-rending recovery act. The plane had dropped from an altitude of 31,000 feet into the Atlantic Ocean. Bodies and pieces of the aircraft were found floating on water. There were no survivors. 22 crew members and 307 passengers were dead. Only 132 bodies were recovered; 197 were lost at sea.

Much later, Flight AI 182 "black box" was recovered from the wreckage at the bottom of the Atlantic Ocean. The recordings of the black box revealed the cockpit area microphone picking up a loud sound at 07:14 GMT. Other data indicated a loss of electrical power following the sound. The flight was brought down by a bomb located in the rear cargo hold, breaking the aircraft in the middle. The aircraft split in two went down in a matter of a few seconds. This explained absence of any distress call to the control tower from the cockpit.

Years of investigations showed that the bomb had been planted by the Sikh extremists campaigning for Khalistan, a separate homeland for the Sikhs in India. The Indian armed forces had stormed the Golden Temple in Amritsar on 5 June 1984 and shot Bhindranwala dead. In retaliation, Indira Gandhi was assassinated by her own Sikh bodyguards on 30 October 1984. Bombing Kanishka was the next major act of Babbar Khalsa militants. This also was the worst terrorist attack in air until the Twin Towers in New York were brought down by the Al-Qaeda terrorists who rammed hijacked planes into them on 11 September 2001.

On the day Kanishka was bombed, another bomb attached to a suitcase exploded in Tokyo's Narita airport killing two luggage handlers who were hauling the suitcases to the cargo of another Air India plane. The bomb detonated prematurely and so instead of exploding in an airborne Air India plane, it went off at the airport. The bomb placed in Kanishka aeroplane was timed to explode in London. But AI 182 was delayed in Toronto while another malfunctioning engine was piggybacked to this plane. Because of this, AI 182 took off at Montreal late by two hours and

the bomb exploded off the Irish coast. Had the bomb exploded in London, the collateral damage would have been massive. The Sikh militants in Canada who owed allegiance to Babbar Khalsa were behind both the bomb blasts. After more than two decades of investigation and trial, only one person, Inderjit Singh who admitted to have supplied parts for assembling the bombs, was convicted.

The ill-fated AI 182 flight carried 329 on board of whom 268 passengers were Canadian citizens of Indian origin or descent and 27 were British. Nine were from other countries including one crew member from Argentina. The remaining crew of 21 were Indian citizens as were three passengers. Of the Indian passengers, one was booked for travel by the Swiss Air the previous night (Friday) to India but he got the ticket changed to Air India flight leaving the next night because he wanted to visit his friend C. S. Rao and his family in Montreal. He flew from Ottawa to Montreal on Friday night. He spent the night in Montreal, visited the Egyptian Expo the next day and ate a meal of his favourite roast leg of lamb with fillings made by Kanakadurga, Rao's wife. Afterwards, Rao and his son drove the guest to the airport. The flight was delayed in Montreal. He was taken to the lounge. After two hours of waiting, he boarded the plane. That person was Dr Y. Nayudamma, who was returning after attending the board meeting of IDRC in Ottawa, never to reach his home.

Ratheish, Nayudamma's son said: 'Believe it or not at 07:11 GMT, I had a telepathic message of distress from my father. He was dying.' Ratheish was no believer in telepathy, occultism or clairvoyance. He got up with a start. He thought he was

hallucinating. But his premonition was proved frightfully correct as over the next few hours the news of the air crash made a deafening roar

Family members, relatives and innumerable friends of Nayudamma from all over the world grieved the sudden death of Nayudamma. Rajagopala Rao, Ratheish's father-in-law, was particularly inconsolable as he recollected the joke he played on Nayudamma. He and Nayudamma had been friends since their youth and their friendship was later cemented by marriage of their children; Nayudamma's son, Ratheish, was married to Rao's daughter. Nayudamma did not have any savings. Rao used to tease Nayudamma, 'I may have to foot your funeral expenses considering you have no bank balance.' To which the playful and quick-witted Nayudamma retorted, 'Forget it! I'll not give you such an opportunity.' Life has a way of mimicking the farce. Ratheish went to Cork, Ireland looking for his father's body. He returned home without the mortal remains of his father as Nayudamma's was one of the 197 bodies lost at sea. Nayudamma fulfilled his promise to Rao, said in jest, though. There was no occasion for the funeral rites as the body was simply not there.

Nayudamma belonged to the world, having served many countries across the continents. His death, therefore, proved that it would not be right to confine him to the narrow boundaries of a country. In the Indian tradition, when the revered saints of some sects leave the world, their physical bodies are given to the rivers. Nayudamma's body too was swallowed by the sea for the aquatic animals. In that sense, nothing of his physical body was wasted.

Seshagir. Rao had embarked on his travel to Argentina when,

after COSTED meeting in Russia, Nayudamma also coincidentally left for IDRC Board of Trustees meeting in Ottawa the same week. He reached Argentina and called on Nayudamma's friend, Dr Alberto Sofia, Director of the Leather Institute, Laplatia on June 24. Rao gave him Nayudamma's letter of introduction. Alberto Sofia looked grim. He got a pot of coffee for Rao and after Rao had finished drinking coffee, he gravely said, "There was an air crash yesterday. I don't believe the sad news but the newspapers reported that Nayudamma was in that plane." Rao had no clue about the crash as he was travelling. He was shell-shocked. His eyes turned misty and it took a long time for him to grasp the fact that Nayudamma was no more.

For Ratheish, who had gone to Ireland looking for his father's body, the tragedy was still unfolding. He had lost his biological mother in 1963 to brain tumour. Pavanabai, his stepmother, whom his father had married in 1964, had looked after him and his two siblings as her own. She would advise others to remain strong in adversity and avoid rash acts. She did not follow this advice in her own case when she heard the news of the air crash. Unable to bear the loss of her loving husband, she asked others who had come to console her, to leave her alone for a while and, after everyone left, she set herself ablaze. Nayudamma was blown up in the air and was torched. Pavanabai probably wanted to prove that she was his equal in death. She was taken to the hospital where for three days the doctors struggled to save her but in vain. Ratheish received the news of the suicide attempt by his mother when he was in Ireland. While he was returning from Ireland empty handed since his father's mortal remains could not be recovered, he learned

of his mother's death. He had the misfortune of performing the last rites of his stepmother and whatever rituals that were possible for his dead father. Barely was he through with these when he received the news that his son, who was a small child, was drowned falling in a pool accidentally while playing. Hardships never visit alone, it seems.

In Nayudamma's death, not only India but also all the developing countries lost an eminent leader and guide. The poor and the down-trodden rural population across the world lost a dear friend.

'It is indeed a bitter irony that so gentle a man who dedicated his life to demonstrating how science and technology can and



Memorial in Toronto

should be used to human benefit was struck down by an appalling and abominable abuse of technology,' said Joseph H. Hulse, vice president, IDRC, who had closely known Nayudamma for a few decades.



Memorial in Ireland

R. Venkataraman, then Vice-President of India, on learning of the tragedy, said, 'It is outrageous that Nayudamma should have died the way he did. From the soaring ascendancy of his pursuit of the knowable, Nayudamma disappeared, in a flash, into the unfathomable depths of the Unknown. Rational processes do not give the entire answer. They also cannot account for Smt. Pavana Nayudamma's extraordinary end within a couple of days of the air crash.'

Always bear in mind that your own resolution to succeed is more important than any other.

— Abraham Lincoln

THE LEGACY

Nayudamma's was a life set in the mould of Aristotle's 'eudaimonia': happiness not as a state but as an activity; happiness derived by doing what one is good at. Nayudamma's core competency was technology for the people and rural development, in which he excelled. He strode the corridors of power with gentle but sure steps; every step dedicated to demonstrate how science and technology could and ought to be used for the benefit of the vast masses. He was a self-made man, a small farmer's son, who rose to heights which people of humble background such as his would not even dream of. Yet, he was a picture of humility and good grace.

'How technological changes in leather industry brought about social changes can be a fascinating study,' Nayudamma said. There can never be a doubt that Nayudamma would be given credit for bringing about a silent social revolution in a caste-ridden Indian society. He lives in the light of the lamps that he lit in the homes of tanners and cobblers, treated as untouchable, neglected and ignored for centuries. Stigma removed, leather industry is now like any other industry. The traditional workers have upgraded their skills and have begun to lead a life of economic and social well-being. High caste Hindus and Muslim women too have begun

to work in the leather industry. Thanks to Nayudamma's inspiration, tanning has become an honourable profession, a Brahmin industry. For just this achievement, Nayudamma would certainly be remembered for a long, long time.

Nayudamma's research work on the composition and constitution of mineral and vegetable tanning systems as well as the mechanism of mineral, vegetable and aldehyde tanning has gained worldwide recognition. Also, he was the only Indian to have authored a chapter on shrinkage phenomena in the Treatise on Leather Technology, a monograph edited by O'Flaherty. This happens to be the most authoritative book on the subject till date. He also wrote a chapter on leather in the Encyclopaedia Britannica. His memory is still fresh through these works.

Nayudamma is a legend in the annals of CLRI for making it the most respected and the largest leather research institute in the world. And it is the only national research institute that awards degrees and doctorates in leather technology in collaboration with Madras and Anna Universities. This is largely due to Nayudamma's initiative and sagacity. As a teacher, he produced many leather technologists and leaders for the leather industry. Nayudamma lives in the bridges that he built between the universities, the industry and the people.

He was a great visionary when he founded or co-founded Indian Hides and Skins Improvement Society, the Indian Leather Fair Society, the Leather Club, and the Coromandel Chemicals. Members of these institutions fondly remember Nayudamma for his foresight.

Nayudamma was the president and guiding spirit of COSTED,

which spearheads a movement for appropriate integration of traditional and emerging technologies. Nayudamma is remembered for his astute leadership of COSTED in its initial years.

In his tribute, Malcom S. Adiseshaiah, former Vice-Chancellor of Madras University and Chairman of Madras Institute of Development Studies, said, 'There appears in history and in society from time to time a person endowed with intellectual qualities of a high order combined with a deep sense of social sympathy. This is a rather rare combination for the usual every day person is one who has either intellectual abilities or a sense of social compassion. To find in one the high qualities of a scientist and the urge of a social reformer is rare indeed. Dr Nayudamma was one such rare person.'

Dr M. S. Swaminathan aptly summed up Nayudamma's life: 'He was a true karmayogi in the ancient Indian tradition and found personal joy and a spiritual fulfilment in a job well done.'

Dr V. K. Saraswat, DG, DRDO and Scientific Advisor to the Defence Minister, said, 'Technology needs to be aligned to the requirement of the people and that's what Nayudamma did.'

Dr K. Lakshminarayana, who worked with the then Chief Minister of Andhra Pradesh, N. T. Ramarao, had known Dr Nayudamma when he was advisor to the Government of Andhra Pradesh. He said, 'Dr Nayudamma's contribution to the development of CLRI and his historic work in applying science and technology for the benefit of the marginalised sections of the society is unparalleled. It was his extraordinary work that inspired me to provide practical skills to the rural students while I headed

the department of Collegiate and Technical Education in Government of Andhra Pradesh.'

Nayudamma was a Governor of IDRC. He died when the plane he was travelling after attending the board meeting of IDRC, Canada was blown up mid-air on 23 June 1985. In recognition of his services to IDRC, the Board Room of IDRC on 14th Floor, 250 Albert Street, Ottawa is named Nayudamma Hall where his memory is still fresh. He also lives in the Nayudamma Lounge adjoining the Board Room where during IDRC conferences participants across the world join for informal conversation and exchange ideas and technologies for the betterment of the poor in the world.

Nayudamma Information Bank, Canada, established in honour of his vision, provides easy access and information to the technologies supported by IDRC, technologies from the South for the South. The bank promotes sharing and updating of information on technological advancements for international development. He is remembered by all those who use the information.

In 1980, when some of his friends, admirers and organizations approached Nayudamma with proposals to start charitable trusts in his name, he at once vetoed the idea. 'No, not when I'm alive,' he said. After his death, many trusts have been set up in his memory and they are all engaged in doing selfless service to the people. He continues to live in the activities of these trusts.

He lives in Nayudamma Memorial Science Foundation, Chennai which has been working in the area of rural development. It also has provided corpus fund to the Indian Institute of Public

Administration, New Delhi for organising Nayudamma memorial lectures every year.

Dr Y. Nayudamma Memorial Trust, Tenali perpetuates his memory. His vision and ideals are remembered every year through the memorial lectures delivered by outstanding scientists who are being conferred Nayudamma Memorial Award by this trust. Sam Pitroda, who changed, among others, the face of telecommunications in India with Technology Missions, Verghese Kurien, who pioneered the white (milk) revolution with his experiment at Anand, Dr Nori Dattatreyaudu, Oncologist, V. K. Saraswat, T. Ramasami, M. S. Swaminathan, and Dr V. Shantha who nurtured Adyar Cancer Institute, Chennai have been some of the recipients of the award.



Dr Y. Nayudamma's memory is fresh in the activities of Nayudamma Foundation for Education and Rural Development, Nadimpalli village, Guntur district which runs a modern high school, a rural library, an eye hospital and an old age home for the rural population.

Condemn none: if you can stretch out a helping hand, do so. If you cannot, fold your hands, bless your brothers, and let them go their own way.

— Swami Vivekananda